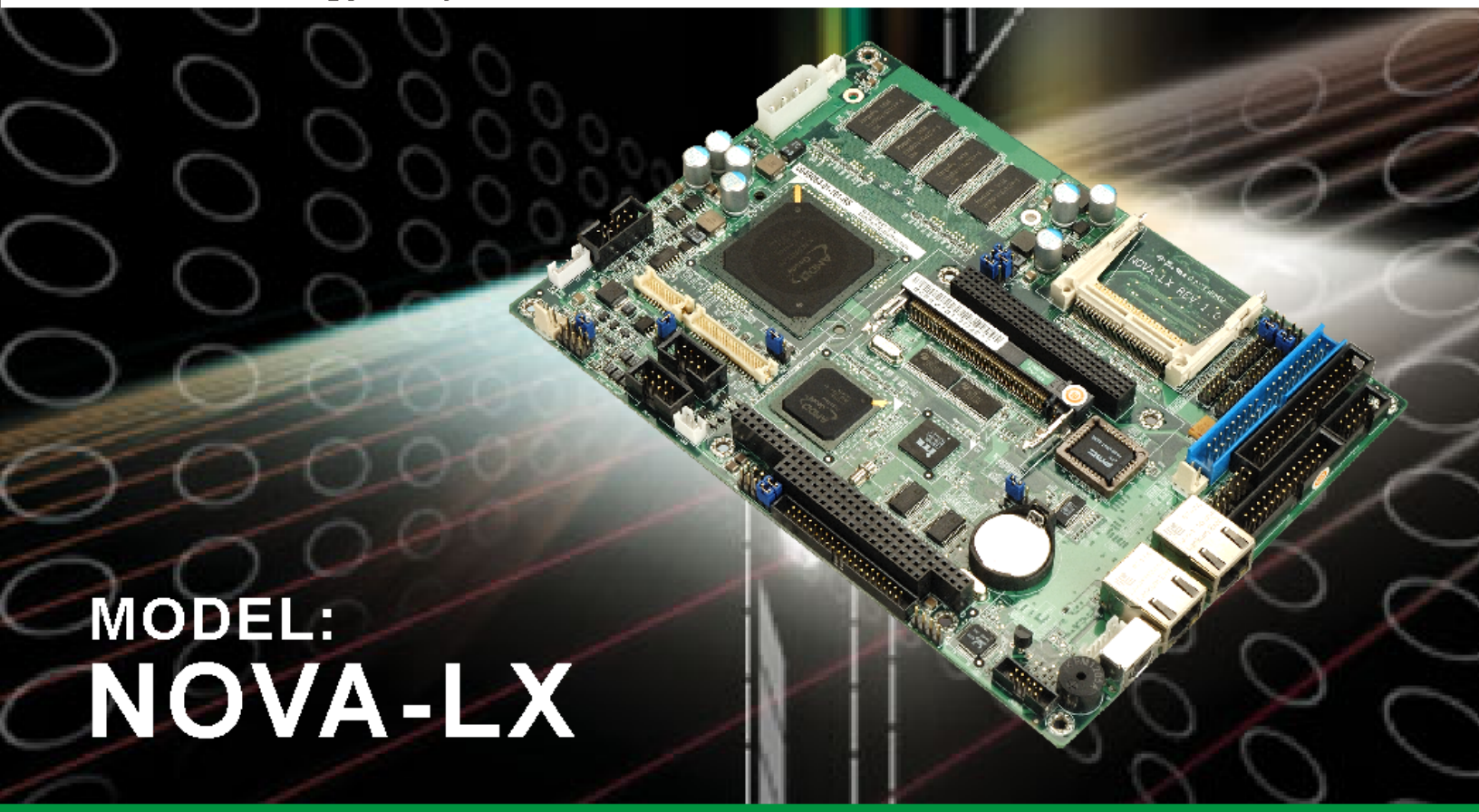
IEI Technology Corp.



MODEL:

NOVA-LX

5.25" AMD Geode™ LX 800 Motherboard with VGA, LVDS and TTL Display Support, Dual LAN, Four USB 2.0 Audio and On-board Memory

User Manual

Rev. 1.00 MAY 2008

RoHS Lead Free

Revision

Date	Version	Changes
2008-03-31	1.00	Initial release

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Manual Conventions

WARNING!

Warnings appear where overlooked details may cause damage to the equipment or result in personal injury. Warnings should be taken seriously. Warnings are easy to recognize. The word “warning” is written as “**WARNING**,” both capitalized and bold and is followed by text. The text is the warning message. A warning message is shown below:

WARNING:

This is an example of a warning message. Failure to adhere to warning messages may result in permanent damage to the NOVA-LX or personal injury to the user. Please take warning messages seriously.

CAUTION!

Cautionary messages should also be heeded to help reduce the chance of losing data or damaging the NOVA-LX. Cautions are easy to recognize. The word “caution” is written as “**CAUTION**,” both capitalized and bold and is followed. The italicized text is the cautionary message. A caution message is shown below:

CAUTION:

This is an example of a caution message. Failure to adhere to cautions messages may result in permanent damage to the NOVA-LX. Please take caution messages seriously.

NOTE:

These messages inform the reader of essential but non-critical information. These messages should be read carefully as any directions or instructions contained therein can help avoid making mistakes. Notes are easy to recognize. The word “note” is written as “**NOTE**,” both capitalized and bold and is followed by text. The text is the cautionary message. A note message is shown below:

NOTE:

This is an example of a note message. Notes should always be read. Notes contain critical information about the NOVA-LX. Please take note messages seriously.

Packing List

NOTE:

If any of the components listed in the checklist below are missing, please do not proceed with the installation. Contact the IEI reseller or vendor you purchased the NOVA-LX from or contact an IEI sales representative directly. To contact an IEI sales representative, please send an email to sales@iei.com.tw.

The items listed below should all be included in the NOVA-LX package.

- 1 x NOVA-LX single board computer
- 1 x mini jumper pack
- 1 x IDE flat cable
- 1 x VGA cable
- 1 x KB/MS Y cable
- 1 x Audio cable
- 1 x 4 RS-232 Adapter cable
- 2 x USB cable
- 2 x single RS-232 cable
- 1 x Utility CD
- 1 x QIG (Quick Installation Guide)

Images of the above items are shown in **Chapter 3**.

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Chapter

1

Introduction

1.1 Overview

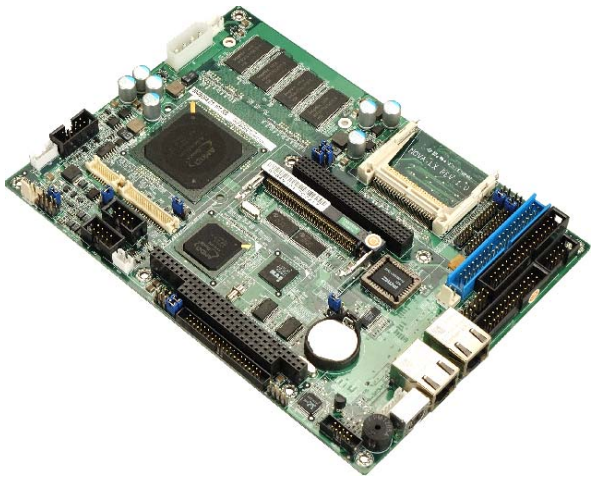


Figure 1-1: NOVA-LX Motherboard

The NOVA-LX 5.25” form factor motherboard is an AMD Geode™ LX 800 platform with 256 MB of on-board DDR SDRAM, support for dual 10/100 Mbps Ethernet, eight serial ports, digital I/O interface and audio. The NOVA-LX also supports multiple display unit types including VGA, LVDS and TTL. A PC/104 slot and four USB 2.0 ports are available for system expansion and peripheral device connection. A Mini PCI slot is also available for expansion. There are two NOVA-LX models. The NOVA-LX-800 operates in a normal temperature range and the NOVA-LX-800W operates in a much wider temperature range.

1.1.1 NOVA-LX Features

Some of the NOVA-LX features are listed below.

- 5.25” form factor
- AMD Geode™ LX 800 processor
- 256 MB on-board memory can be increased to 512 MB
- Supports VGA, 24-bit TTL and single-channel 18-bit LVDS displays
- Six RS-232 serial connectors and two RS-232/422/485 serial connectors
- Wide operating temperature supported
- RoHS compliant
- Supports AT or ATX power supplies

1.2 NOVA-LX Overview

1.2.1 NOVA-LX Overview Photo

The NOVA-LX has a wide variety of peripheral interface connectors. **Figure 1-2** is a labeled photo of the peripheral interface connectors on the NOVA-LX.

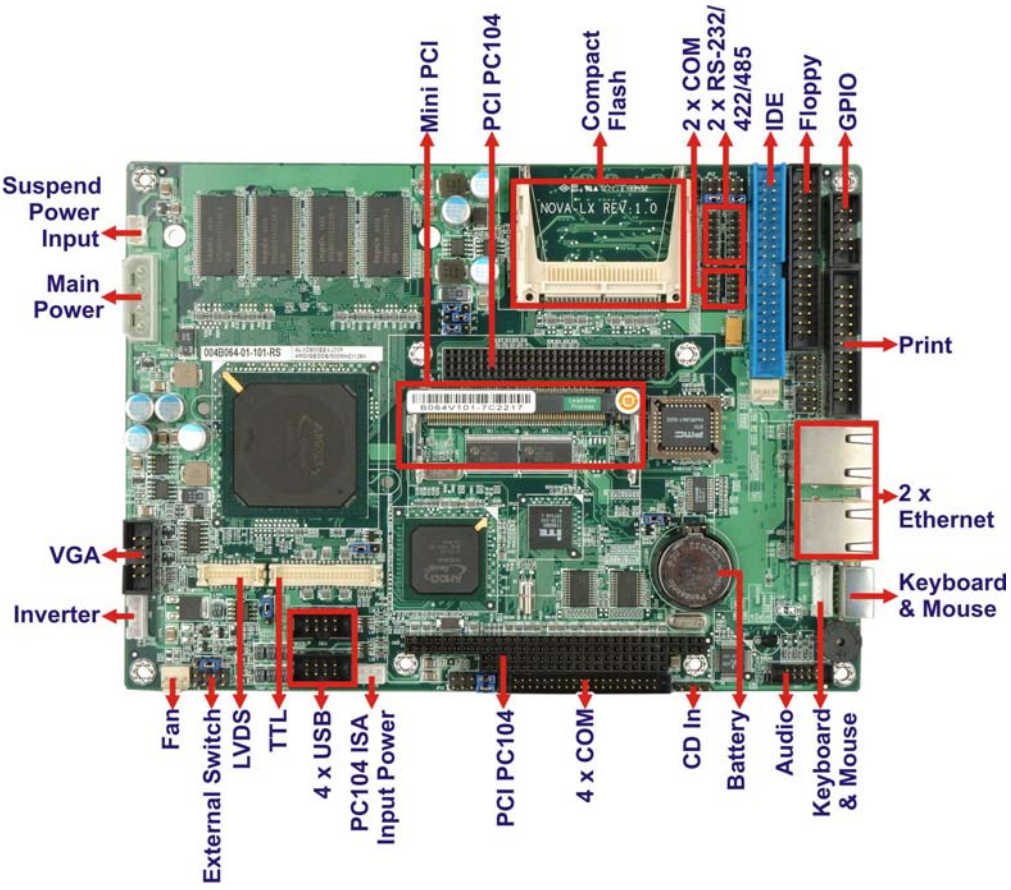


Figure 1-2: NOVA-LX Overview [Front View]

1.2.2 NOVA-LX Peripheral Connectors and Jumpers

The NOVA-LX has the following connectors on-board:

- 1 x ATX +12V/5V power connector
- 1 x ATX power enable connector
- 1 x Audio connector
- 1 x Backlight inverter connector

- 1 x Battery connector
- 1 x CD-in connector
- 1 x CompactFlash® Type II (CF Type II) socket
- 1 x Fan connectors
- 1 x Floppy disk (FDD) connector
- 1 x Front panel connector
- 1 x General purpose input/output (GPIO) connector
- 1 x HDD connector
- 1 x Keyboard and mouse connector
- 1 x LVDS connector
- 1 x Parallel port connector
- 1 x PC/104-Plus connector
- 1 x PC/104-Plus ISA power connector
- 1 x Quad RS-232 serial port connector
- 2 x RS-232 serial port connectors
- 2 x RS-232/422/485 serial port connector
- 1 x TTL connector
- 2 x USB 2.0 connectors (support four USB devices)
- 1 x VGA connector

The NOVA-LX has the following external peripheral interface connectors on the board rear panel

- 2 x Ethernet connectors
- 1 x PS/2 connectors

The NOVA-LX has the following on-board jumpers:

- AT or ATX power select
- CF card setup
- Clear CMOS
- COM 1/2 Pin 9 setting
- COM 3 function select
- COM 4 function select
- LCD clock setting
- LCD voltage selection

- PCI-104 Voltage Setup
- PC/104-Plus SERIRQ Select

1.2.3 Technical Specifications

NOVA-LX technical specifications are listed in **Table 1-1**. See **Chapter 2** for details.

Specification	NOVA-LX
Form Factor	5.25”
System CPU	AMD Geode™ LX 800
System Chipset	AMD Geode™ CS5536
Memory	256 MB DDR SDRAM on-board
Display	VGA integrated into the AMD Geode™ LX 800 One 24-bit TTL One 18-bit single-channel LVDS
BIOS	AMI Flash BIOS
Audio	RealTek ALC203 AC’97 codec
Expansion Options	One PC/104-Plus One Minic PCI
LAN	Dual 10/100 Mbps RealTek RTL8100C Ethernet chipsets
SuperIO	Winbond W83627EHG
SSD	CF Type II
Digital I/O	8-bit digital I/O, 4-bit input/4-bit output
COM	Six RS-232 serial ports (internal) Two RS-232, RS-422 or RS-485 serial port (internal)
USB 2.0	Four USB 2.0 devices supported

IDE	One 40-pin IDE connector connects to two Ultra ATA33/66/100 devices
Floppy Disk Drivers	One FDD
Keyboard/mouse	One PS/2 connectors for keyboard and mouse
Parallel Port	One 26-pin parallel port connects to parallel communications device (e.g. printer)
Watchdog Timer	Software programmable 1-255 sec. by super I/O
Power Supply	5 V only 12 V for LCD and COM1 and COM2
Power Type	AT or ATX
Power Consumption	5 V @ 1.66 A (500 MHz AMD Geode™ LX 800 processor with 256 MB on-board memory.)
Temperature	**NOVA-LX-800:** 0ºC – 60ºC (32ºF - 140ºF)’ **NOVA-LX-800W:** -20ºC – +70ºC (-4ºF - 158ºF)
Humidity (operating)	5%~95% non-condensing
Dimensions (LxW)	203 mm x 146 mm
Weight (GW/NW)	700 g/260 g

Table 1-1: Technical Specifications

Chapter

2

Detailed Specifications

2.1 Dimensions

2.1.1 Board Dimensions

The dimensions of the board are listed below:

- **Length**: 203 mm
- **Width**: 146 mm

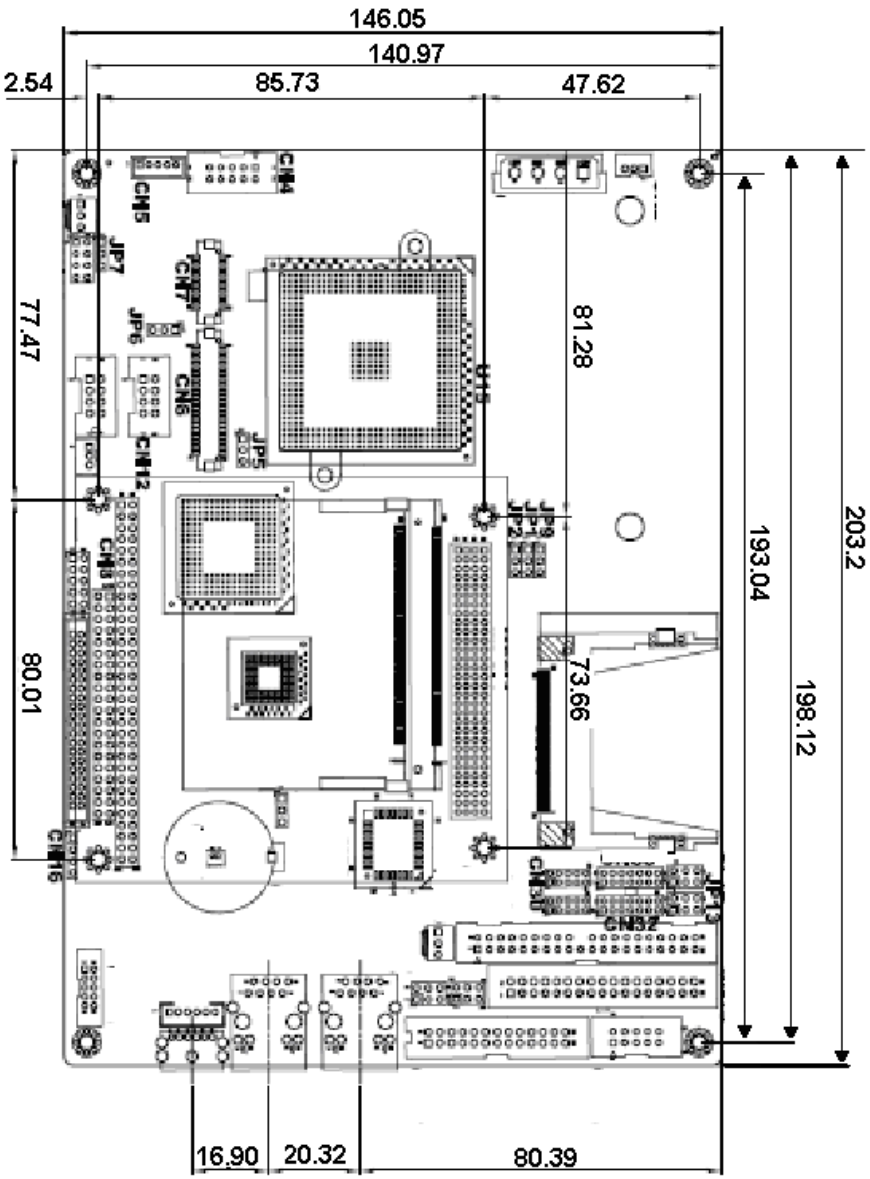


Figure 2-1: NOVA-LX Dimensions (mm)

2.1.2 External Interface Panel Dimensions

External peripheral interface connector panel dimensions are shown in **Figure 2-2**.

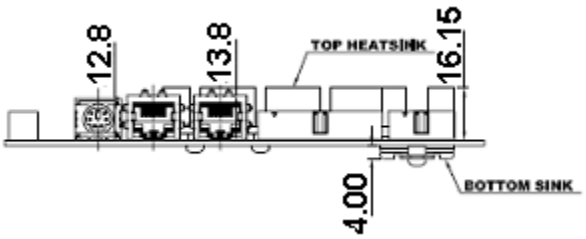


Figure 2-2: External Interface Panel Dimensions (mm)

2.2 Data Flow

Figure 2-3 shows the data flow between the two on-board chipsets and other components installed on the motherboard and described in the following sections of this chapter.

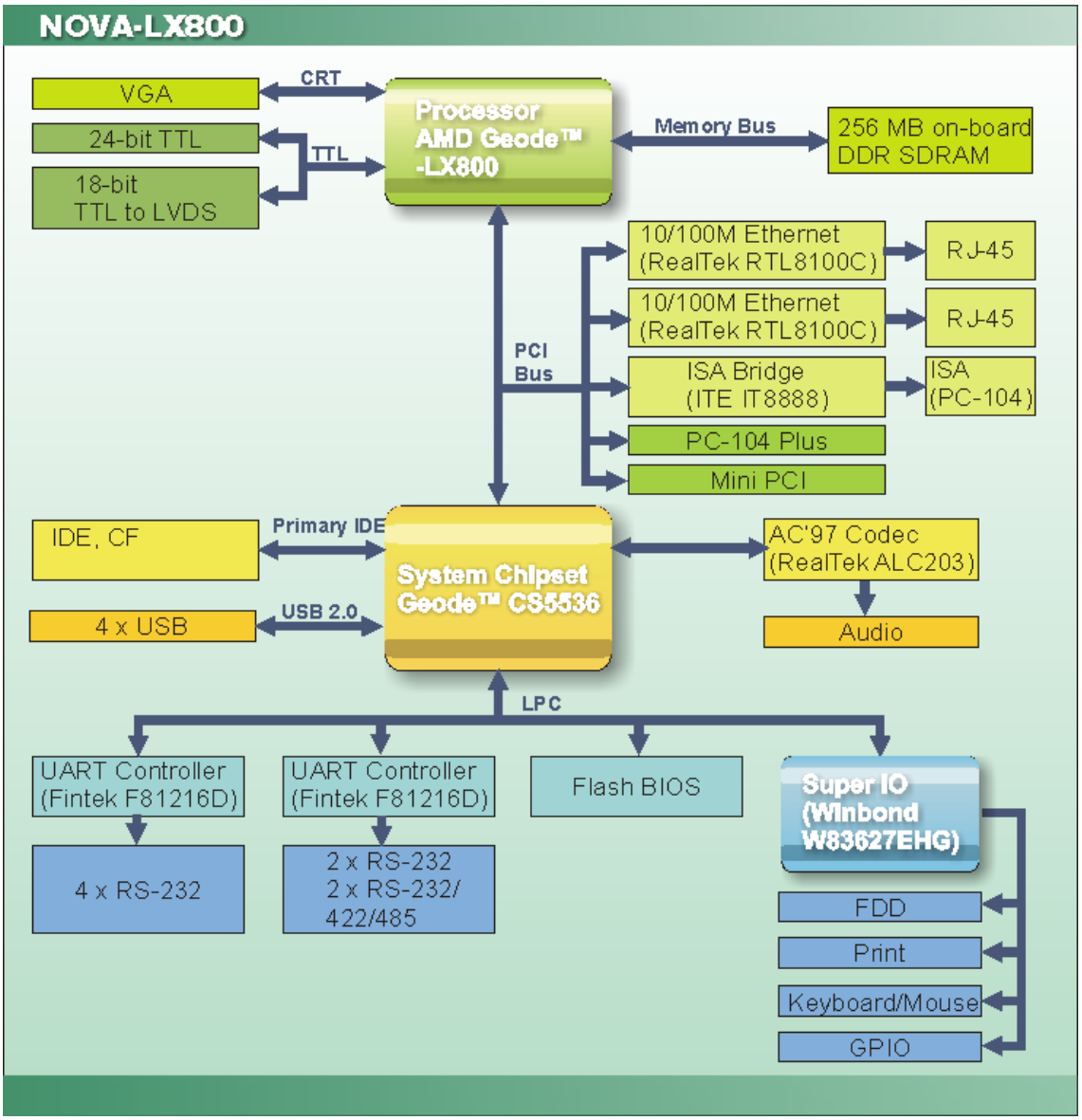


Figure 2-3: Data Flow Block Diagram

2.3 AMD® Geode™ LX 800 CPU Support

The NOVA-LX series motherboards all come with a preinstalled AMD® Geode™ LX 800 500MHz CPU.

2.3.1 AMD® Geode™ LX 800 500MHz Overview

The specifications for the 500MHz AMD® Geode™ LX 800 are listed below

- x86/x87-compatible core
- Processor frequency up to 500 MHZ
- 64K I/64K D L1 cache and 128K L2 cache
- Split I/D cache/TLB (Translation Look-Aside Buffer)
- Integrated FPU that supports the Intel MMX® and AMD 3DNow!™ Technology instruction sets
- 9 GB/s internal GeodeLink™ Interface Unit (GLIU)
- Security Block
  - 128-bit AES (CBC/ECB)
- True Random Number Generator

2.3.2 AMD Geode™ LX 800 Memory Support

The AMD Geode™ LX 800 supports 64-bit DDR memory modules with frequencies up to 400 MHz. The NOVA-LX has four optional preinstalled DDR SDRAM memory modules. Each memory module has a capacity 64 MB. The 512 Mb (64 MB) DDR SDRAM modules have a clock frequency of 200 MHz and a maximum data transmission rate of 200 Mbps per pin.

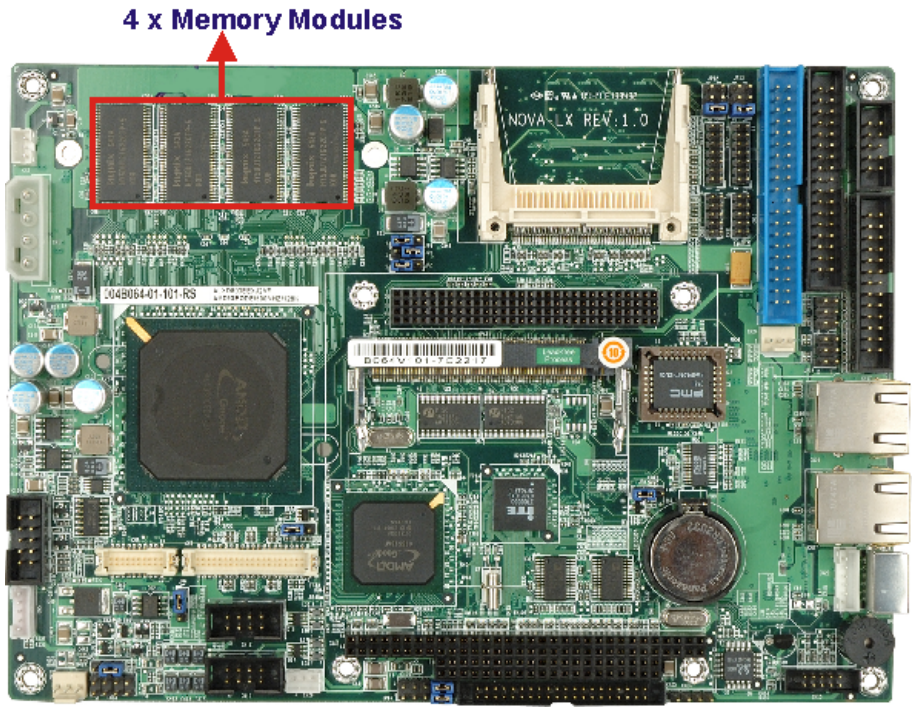


Figure 2-4: Memory Modules

2.3.3 AMD® Geode™ LX 800 500MHz Display Support

The AMD® Geode™ LX 800 supports both CRT and TFT in a dual display mode. The following display specifications.

- Supported Standards
  - High Definition (HD)
  - Standard Definition (SD)
- Supported Resolution
  - 1920x1440 in CRT mode
  - 1600x1200 in TFT mode
- VESA 1.1 and 2.0 VIP/VDA support

2.3.4 AMD Geode™ LX 800 500MHz Graphics processor

The AMD Geode™ LX 800 BitBLT/vector engine graphics processor supports pattern generation, source expansion, pattern/source transparency, 256 ternary raster operations, alpha blenders to support alpha- BLTs, incorporated BLT FIFOs, a GeodeLink interface

and the ability to throttle BLTs according to video timing. New features added to the Graphics Processor include:

- Command buffer interface
- Hardware accelerated rotation BLTs
- Color depth conversion
- Paletized color
- Full 8x8 color pattern buffer
- Separate base addresses for all channels
- Monochrome inversion

Table 2-1: Geode LX Graphics Features lists a complete list of Geode™ LX 800 graphics features. For more details, please refer to the AMD website or the Geode™ LX 800 series data book available from AMD.

Feature	AMD Geode™ LX Processor
Color Depth	8, 16, 32 bpp (A) RGB 4 and 8-bit indexed
ROPs	256 (2-src, dest and pattern)
BLT Buffers	FIFOs in Graphics Processor
BLT Splitting	Managed by hardware
Video Synchronized BLT/Vector	Throttle by VBLANK
Bresenham Lines	Yes
Patterned (stippled) Lines	Yes
Screen to Screen BLT	Yes
Screen to Screen BLT with mono expansion	Yes
Memory to Screen BLT	Yes (throttled rep movs writes)
Accelerated Text	No
Pattern Size (Mono)	8x8 pixels
Pattern Size (Color)	8x8 pixels
Monochrome Pattern	Yes (with inversion)
Dithered Pattern (4 color)	No
Color Pattern	8, 16, 32 bpp
Transparent Pattern	Monochrome
Solid Fill	Yes

Pattern Fill	Yes
Transparent Source	Monochrome
Color Key Source Transparency	Y with mask
Variable Source Stride	Yes
Variable Destination Stride	Yes
Destination Write Bursting	Yes
Selectable BLT Direction	Vertical and Horizontal
Alpha BLT	Yes (constant α, α/pix, or sep. α channel)
VGA Support	Decodes VGA Register
Pipeline Depth	Unlimited
Accelerated Rotation BLT	8, 16, 32 bpp
Color Depth Conversion	5:6:5, 1:5:5:5, 4:4:4:4, 8:8:8:8

Table 2-1: Geode LX Graphics Features

2.3.5 AMD Geode™ LX 800 500MHz Power Management

The power management for the 500 MHz AMD Geode™ LX 800 is listed below:

- 1.8W Typical (3.9W TDP) @ 500MHz
- GeodeLink active hardware power management
- Hardware support for standard ACPI software power management
- I/O companion SUSP#/SUSPA# power controls
- Lower power I/O
- Wakeup on SMI/INTR

2.4 AMD Geode™ CS5536 System Chipset

The NOVA-LX series motherboards all have a preinstalled AMD Geode™ CS5536 system chipset. The system chipset features are listed below.

- 82xx Legacy Devices
- System Management Bus (SMB) Controller
- 8 Multi-Function General Purpose Timers (MFGPTs)
- Power Management Controller
- ACPI v2.0 compliant

2.4.1 GeodeLink™ Interface Unit

The GeodeLink™ interface unit connects the AMD Geode™ LX 800 processor to the AMD Geode™ CS5536 system chipsets. Some of the GeodeLink™ features are listed below.

- 64-bit, 66MHz operation
- PCI VSM (Virtual System Module) that makes the interface transparent to applications software and BIOS
- Programmable routing descriptors, use and activity monitors, and SSMI (Synchronous System Management Interrupt)

2.4.2 AMD Geode™ CS5536 ATA-6 Controller

The single NOVA-LX IDE connector supports two ATA-6 HDDs. An ATA-6 (Ultra ATA/100) compliant IDE controller on the AMD Geode™ CS5536 has a maximum transfer rate of 100MB/s. ATA-6 includes advancements in error checking and ATA-6 drives are compatible with future interface additions.

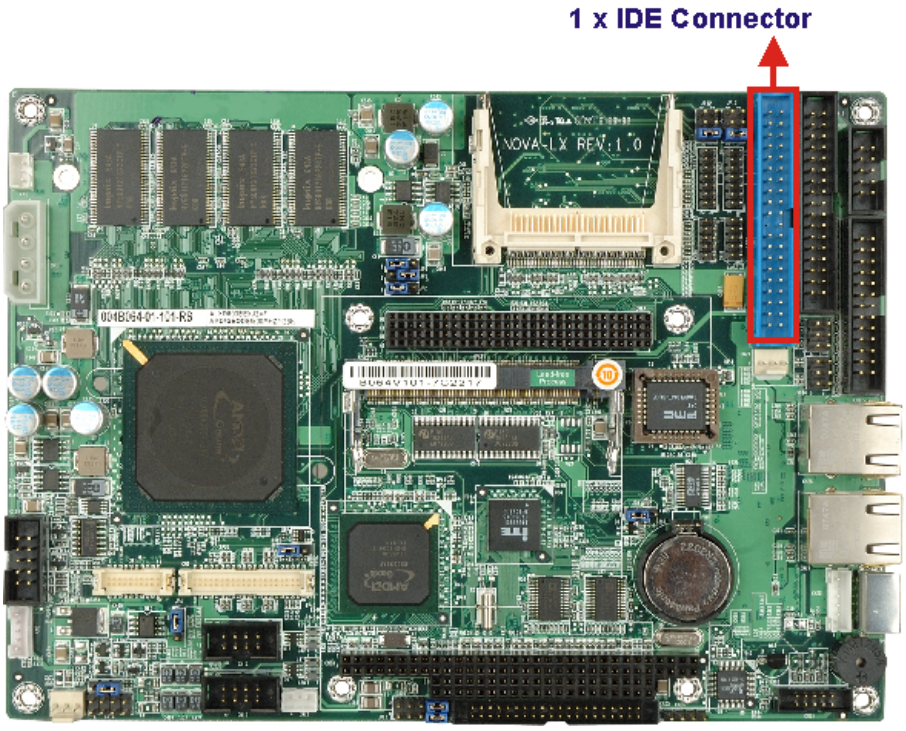


Figure 2-5: IDE Connector

The onboard ATA-6 controller is able to support the following IDE HDDs:

- **Ultra ATA/100**, with data transfer rates up to 100MB/s
- **Ultra ATA/66**, with data transfer rates up to 66MB/s
- **Ultra ATA/33**, with data transfer rates up to 33MB/s

Specification	Ultra ATA/100	Ultra ATA/66	Ultra ATA/100
IDE devices	2	2	2
PIO Mode	0 – 4	0 – 4	0 – 4
PIO Max Transfer Rate	16.6 MB/s	16.6 MB/s	16.6 MB/s
DMA/UDMA designation	UDMA 3 - 4	UDMA 3 – 4	UDMA 2
DMA/UDMA Max Transfer	100MB/s	66MB/s	33MB/s
Controller Interface	5V	5V	5V

Table 2-2: Supported HDD Specifications

2.4.3 AMD Geode™ CS5536 Audio Codec 97 (AC’97) Controller

The AC’97 specification v2.3 compliant controller on the chipset is interfaced to a 20-bit DAC and 18-bit ADC full-duplex AC'97 2.3 stereo RealTek ALC203 codec. The ALC203 is then connected to a 10-pin audio connector to which an audio kit can easily be connected.

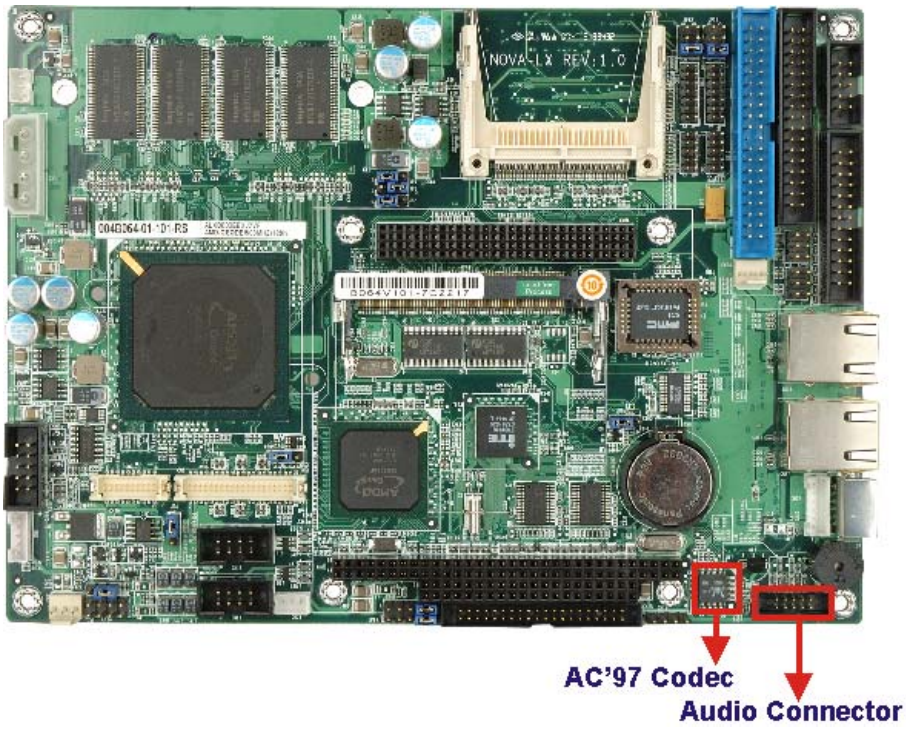


Figure 2-6: AC’97 Codec and Audio Connector

The codec meets performance requirements for audio on PC99/2001 systems. Some of the codec features are listed below.

- Meets Microsoft WHQL/WLP 2.0 audio requirements
- 20-bit DAC and 18-bit ADC resolution
- 18-bit Stereo full-duplex CODEC with independent and variable sampling rate
- Complies with AC'97 2.3 specifications
  - LINE/HP-OUT, MIC-IN and LINE-IN sensing
  - 14.318MHz -> 24.576MHz PLL saves crystal
  - 12.288MHz BITCLK input can be consumed
  - Integrated PCBEEP generator to save buzzer
  - Interrupt capability
  - Page registers and Analog Plug & Play
- Support of S/PDIF out is fully compliant with AC'97 rev2.3 specifications
- Three analog line-level stereo inputs with 5-bit volume control: LINE_IN, CD, AUX

- High quality differential CD input
- Two analog line-level mono input: PCBEEP, PHONE-IN
- Supports double sampling rate (96KHz) of DVD audio playback
- Two software selectable MIC inputs
- +6/12/20/30dB boost preamplifier for MIC input
- Stereo output with 6-bit volume control
- Mono output with 5-bit volume control
- Headphone output with 50mW/20Ohm amplifier
- 3D Stereo Enhancement
- Multiple CODEC extension capability
- External Amplifier Power Down (EAPD) capability
- Power management and enhanced power saving features
- Stereo MIC record for AEC/BF application
- DC Voltage volume control
- Auxiliary power to support Power Off CD
- Adjustable VREFOUT control
- 2 GPIO pins with smart GPIO volume control
- 2 Universal Audio Jacks (UAJ)® for front panel
- Supports 32K/44.1K/48K/96KHz S/PDIF output
- Supports 32K/44.1K/48KHz S/PDIF input
- Power support: Digital: 3.3V; Analog: 3.3V/5V
- Standard 48-Pin LQFP Package
- EAX™ 1.0 & 2.0 compatible
- Direct Sound 3D™ compatible
- A3D™ compatible
- I3DL2 compatible
- HRTF 3D Positional Audio
- Sensaura™ 3D Enhancement (optional)
- 10 Bands of Software Equalizer
- Voice Cancellation and Key Shifting in Kareoke mode
- AVRack® Media Player

2.4.4 AMD Geode™ CS5536 Flash Interface

The NOVA-LX CompactFlash socket supports standard CF Type I and CF Type II cards. The chipset flash interface is multiplexed with an IDE interface and can be connected to an array of industry standard NAND Flash or NOR Flash devices.

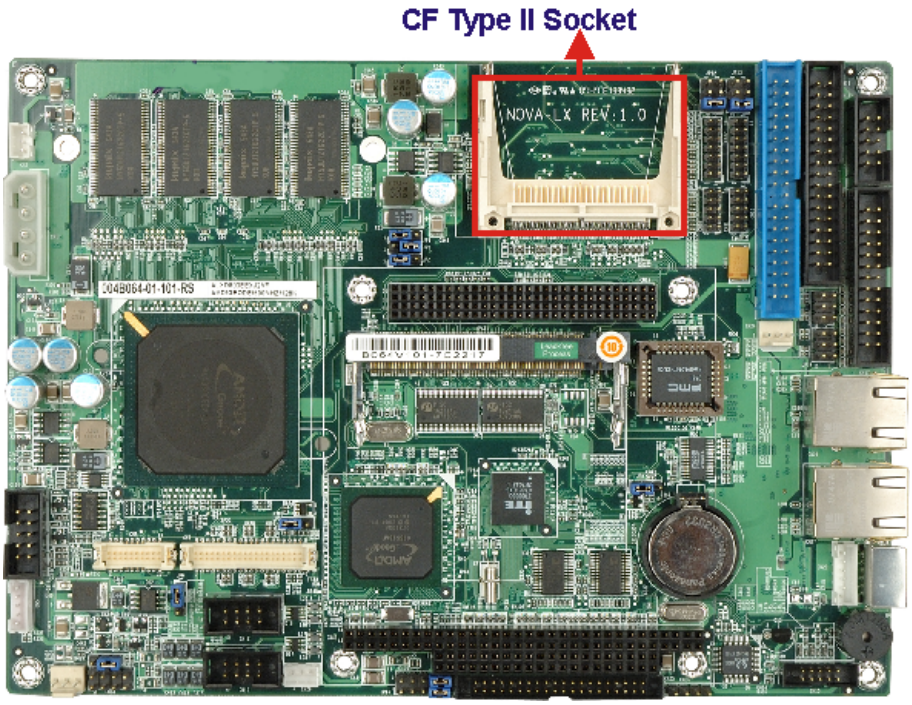


Figure 2-7: CompactFlash Connector

2.4.5 AMD Geode™ CS5536 USB Controller

Four USB ports on the NOVA-LX board are interfaced to the chipset USB controller. Four USB 1.1 or USB 2.0 devices can be connected simultaneously to the NOVA-LX. The chipset USB controller has the following specifications:

- 4 USB ports
- USB 1.1 and USB 2.0 compliant

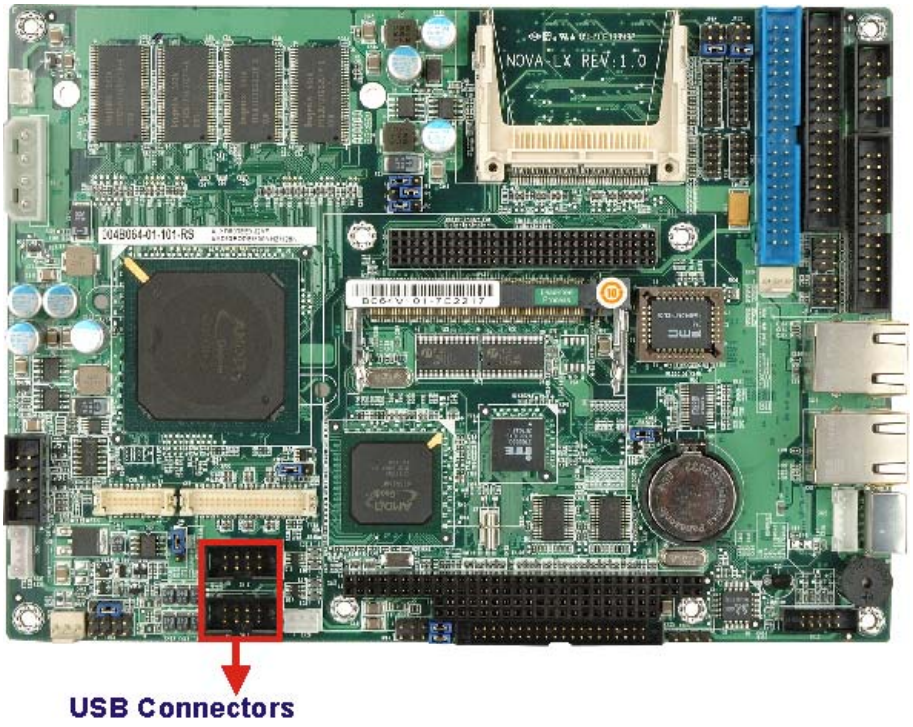


Figure 2-8: USB Connectors

2.4.6 AMD Geode™ CS5536 Serial Communications

Eight high-speed UART serial port connectors, seven RS-232 and one that can be configured as RS-232, RS-422 or RS-485, are connected to the system chipset low pin count (LPC) port via the LPC bus. The specifications for the serial ports are listed below.

- 16C550 UART with 16-byte FIFO buffer
- 115.2Kbps transmission rate

2.4.7 AMD Geode™ CS5536 Real Time Clock

The system chipset has a battery backed up 256-byte real-time clock (RTC) with CMOS RAM.

2.4.8 BIOS

The BIOS flash memory chip on the NOVA-LX has a licensed copy of AMI BIOS loaded onto it. The BIOS flash memory chip is connected to the chipset via the LPC bus. The flash BIOS features are listed below:

- SMIBIOS (DMI) compliant
- Console redirection function support
- USB booting support

2.5 LPC Bus Components

2.5.1 LPC Bus Overview

The LPC bus is connected to components listed below:

- 1 x BIOS chipset
- 1 x Super I/O chipset
- 2 x Serial port chipsets

2.5.2 BIOS

The BIOS flash memory chip on the NOVA-LX has a licensed copy of AMI BIOS loaded onto it. The BIOS flash memory chip is connected to the chipset via the LPC bus. The flash BIOS features are listed below:

- SMIBIOS (DMI) compliant
- Console redirection function support
- PXE (**P**re-Boot E**x**ecution **E**nvironment) support
- USB booting support

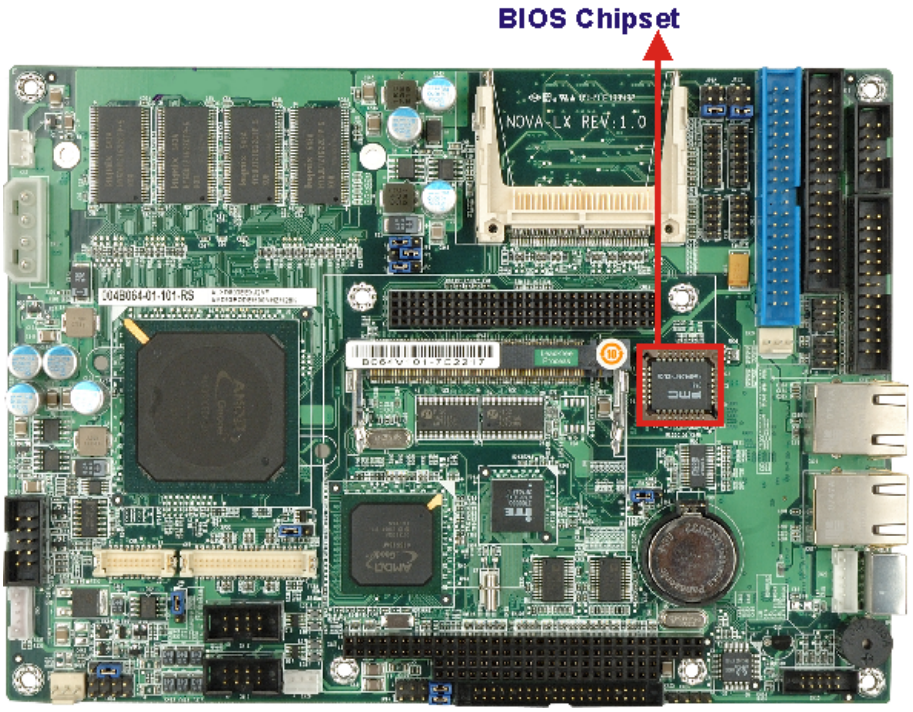


Figure 2-9: BIOS Chipset

2.5.3 Winbond W83627EHG Super I/O chipset

The Winbond W83627HG Super I/O chipset is connected to the system chipset through the LPC bus.

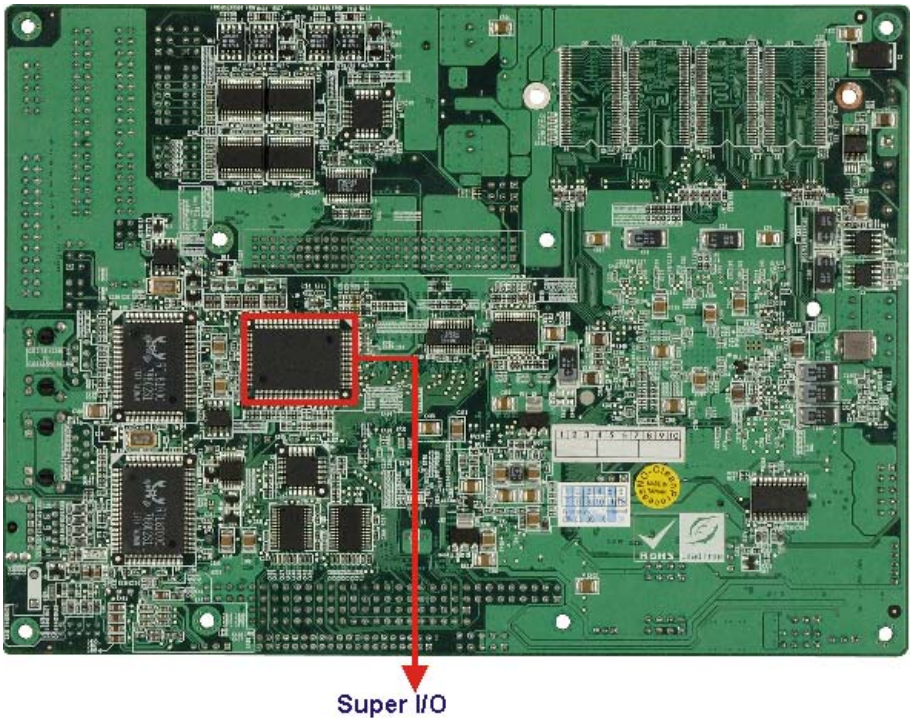


Figure 2-10: Super I/O Chipset

The Winbond W83627EHG is an LPC interface-based Super I/O device that comes with Environment Controller integration, floppy disk controller, and UART controller. Some of the features of the Winbond W83697EHG chipset are listed below:

- LPC Spec. 1.01 compliant
- LDRQ# (LPC DMA) and SERIRQ (serial IRQ) supported
- Hardware monitor functions integrated
- Microsoft PC98/PC99 Hardware Design Guide compliant
- ACPI DPM (Device Power Management) supported

Some of the Super I/O features are described in more detail below:

2.5.3.1 Super I/O LPC Interface

The LPC interface on the Super I/O complies with the Intel® Low Pin Count Specification Rev. 1.01. The LPC interface supports both LDRQ# and SERIRQ protocols as well as PCI PME# interfaces.

2.5.3.2 Super I/O Hardware Monitor Functions

The Super I/O Hardware Monitor monitors internal voltages, system temperature and the cooling fan speed. All the monitored environmental parameters can be read from the BIOS Hardware Health Configuration menu.

2.5.3.3 Super I/O Parallel Port

The Super I/O parallel port (LPT) is compatible with the following LPT specifications.

- IBM parallel port compatible
- PS/2 compatible bi-directional parallel port
- Enhanced Parallel Port (EPP) mode supported. Compatible with IEEE 1284 specifications
- Extended Parallel Port (EPP) mode supported. Compatible with IEEE 1284 specifications
- Enhanced printer port back-drive current protection

The parallel port controller is connected to an external DB-26 LPT connector.

2.5.3.4 Super I/O Floppy Disk Drive (FDD) Controller

The Super I/O FDD controller is compatible with the following specifications.

- IBM PC AT disk drive compatible
- Variable write pre-compensation with track selectable capability
- Vertical recording format supported
- DMA logic enabled
- 16-byte data FIFOs
- Overrun and under run conditions detected
- Built-in address mark detection circuitry to simplify the read electronics
- FDD anti-virus functions with software write protect and FDD write enable signal
- Supports 3.5-inch or 5.25-inch FDD
- Compatible with industry standard 82077
- Supported capacities:
  - 360K

- 720K
- 1.2M
- 1.44M
- 2.88M

- Supported transfer rates
  - 250Kbps
  - 300Kbps
  - 500Kbps
  - 1Mbps
  - 2Mbps
- 3-mode FDD and Win95/98 driver supported

The FDD controller is interfaced to a FDD connected to the backplane through the board-to-board connectors.

2.5.3.5 Super I/O Keyboard and Mouse Controller

The Super I/O keyboard and mouse controller is compatible with the following specifications.

- 8042 compatible
- Asynchronous access to two data registers and one status register
- Compatible with 8042 software
- PS/2 mouse supported
- Port 92 supported
- Interrupt and polling modes supported
- Fast Gate A20 and Hardware Keyboard Reset
- 8-bit timer/counter

The keyboard and mouse controller controller is interfaced to a keyboard and mouse connected to the backplane through the board-to-board connectors.

2.5.3.6 Super I/O GPIO Ports

The Super I/O has 22 programmable GPIO ports.

2.5.3.7 Super I/O Fan Speed and Fan Control

The super I/O can both monitor and control the fan speed. The super I/O is interfaced to the fan on the backplane through the board-to-board connectors.

2.5.4 Serial Port Chipset

Two Fintek F81216DG chipsets on the NOVA-LX support six RS-232 serial ports and two RS-232/422/484 serial ports. The Fintek serial port chipset is interfaced to the southbridge chipset through the LPC bus. Some of the features of the Fintek chipset are listed below:

- Supports LPC interface
- Totally provides 4 UART (16550 asynchronous) ports
  - 3 x Pure UART
  - 1 x UART+IR
- One Watch dog timer with WDTOUT# signal
- One Frequency input 24/48MHz
- Powered by 3Vcc

2.6 PCI Bus

2.6.1 PCI Bus Overview

The PCI bus on the Geode™ CS5536 chipset is interfaced through the GeodeLink connection between the Geode™ CS5536 and the Geode™ LX 800. Some features of the PCI bus are listed below:

- PCI specification v2.2 compliant
- 32-Bit, 33 MHz or 66 MHz operation
- Transaction FIFOs (First In/First Out)
- Bus master or slave
- Converts selected PCI configuration bus internal MSR (Model Specific Register)
- Capable of handling in-bound transactions immediately after reset - no setup
- Mapping of PCI virtual configuration space space is done completely in Virtual System Architecture (VSA) code
- Serialized processor control interface

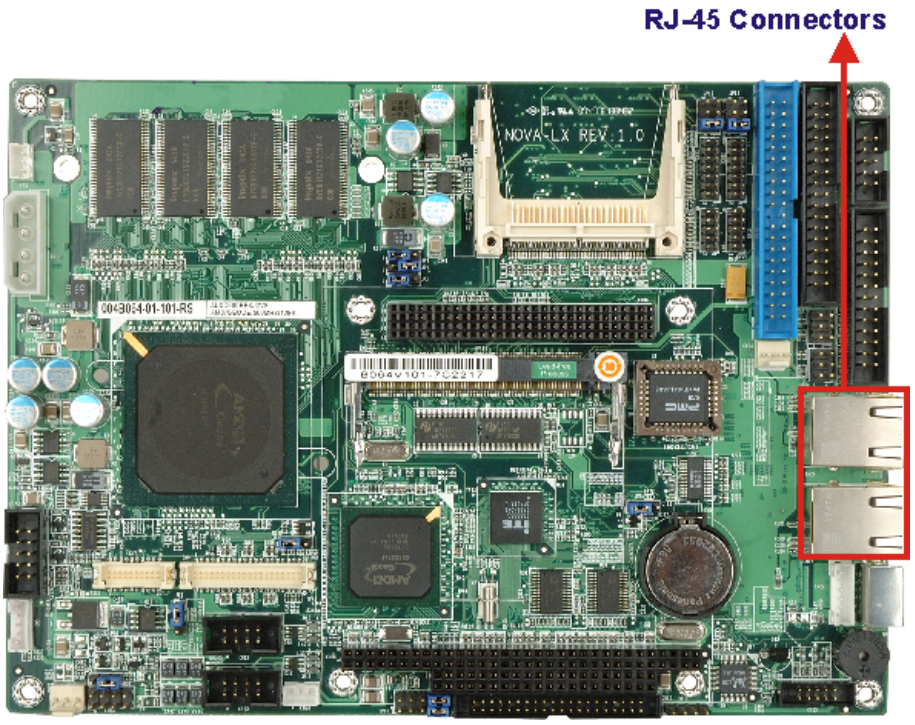
2.6.2 PCI Bus Components

The following components are interfaced through the PCI bus

- 2 x PCI Ethernet controllers
- 1 x PCI-to-ISA bridge
- 1 x PC/104-Plus interface
- 1 x Mini PCI slot

2.6.3 RealTek RTL8100C PCI Express Fast Ethernet Controller

The PCI bus is interfaced to two RealTek RTL8100C Fast Ethernet controllers, which are then connected to two RJ-45 connectors. See **Figure 2-11**.



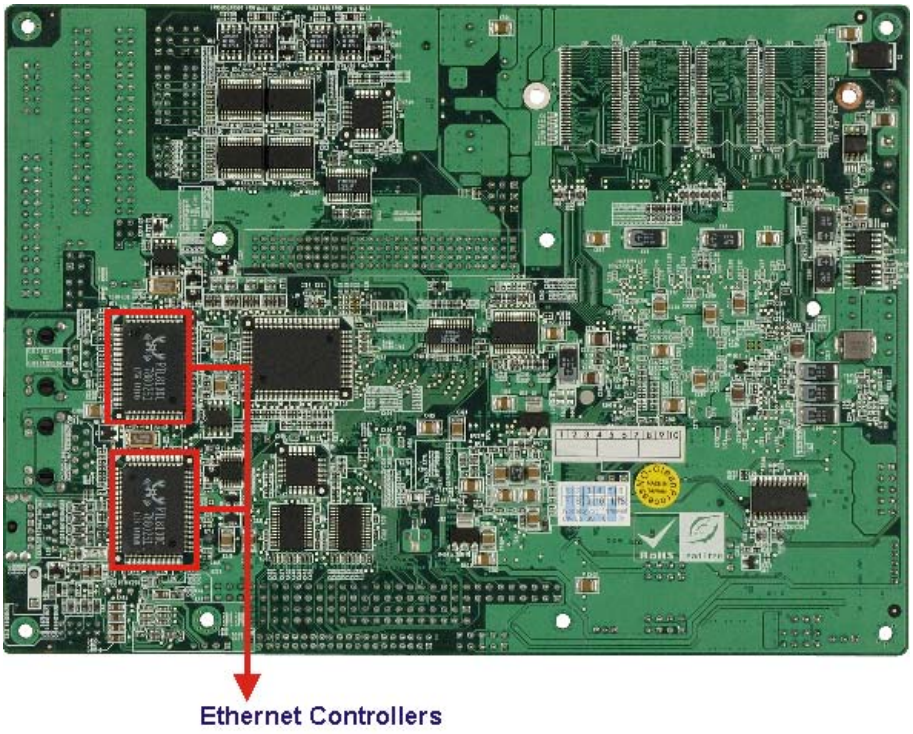


Figure 2-11: Ethernet Interface

Some of the features of the Realtek RTL8100C are listed below:

- Supports PCI/mini-PCI interfaces
- Integrates Fast Ethernet MAC, physical chip, and transceiver onto a single chip
- 10Mbps and 100Mbps operation
- Supports 10Mbps and 100Mbps N-way auto-negotiation
- Supports 25MHz Crystal or 25MHz OSC as the internal clock source
- Complies with PC99/PC2001 standards
- Supports ACPI power management
- Provides PCI bus master data transfer
- Provides PCI memory space or I/O space mapped data transfer
- Supports PCI clock speed of 16.75MHz-40MHz
- Advanced power saving mode
- Supports Wake-on-LAN and remote wake-up (AMD Magic Packet™, Link Change, and Microsoft® Wake-up frame)
- Half/Full duplex capability

- Supports Full Duplex Flow Control (IEEE 802.3x)
- Provides interface to 93C46 EEPROM to store resource configuration and ID parameters
- Provides PCI clock run pin
- Provides LED pins for network operation status indication
- 2.5/3.3V power supply with 5V tolerant I/Os

2.6.4 ITE IT8888F PCI-to-ISA Bridge

An ITE IT8888F PCI to ISA bridge single function device enables legacy ISA card expansion on the backplane. The PCI to ISA bridge is shown in below.

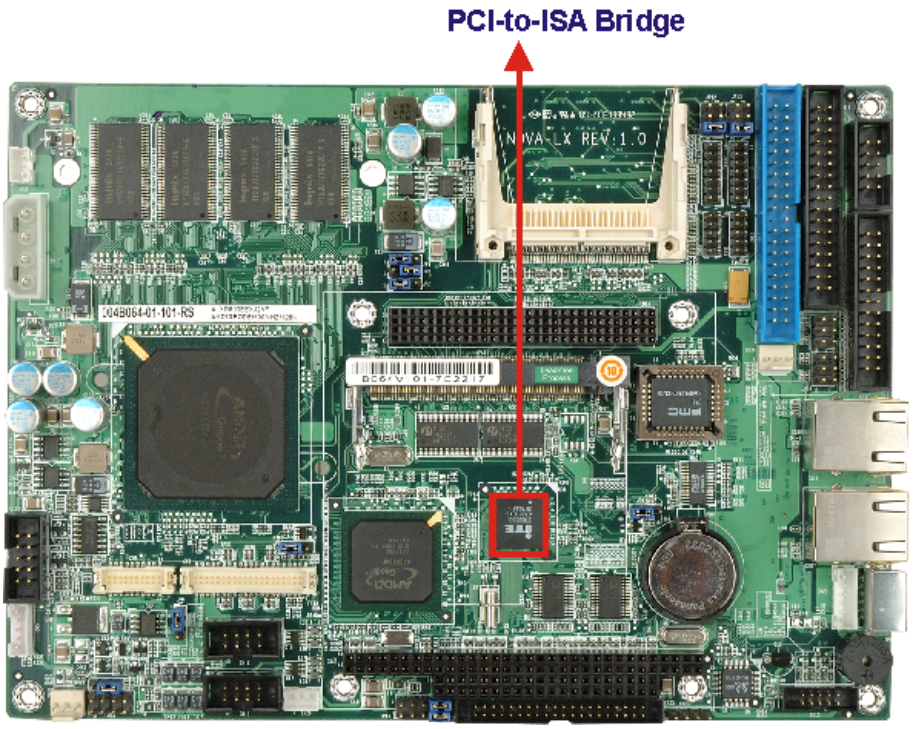


Figure 2-12: PCI-to-ISA Bridge

The IT8888F has a PCI specification v2.1 compliant 32-bit PCI bus interface and supports both PCI Bus master and slave. The PCI interface supports both programmable positive and full subtractive decoding schemes. Some of the features of the IT8888F PCI to ISA bridge are listed below.

- PCI Interface

- Programmable PCI Address Decoders
- PC/PCI DMA Controller
- Distributed DMA Controller
- ISA Interface
- SM Bus
- Serial IRQ
- Supports NOGO function
- Single 33 MHz Clock Input
- +3.3V PCI I/F with +5V tolerant I/O buffers
- +5V ISA I/F and core Power Supply

2.6.5 PC/104-Plus Interface

The PC/104-Plus interface comprises of the following components:

- 120-pin PCI connector
- 104-pin ISA bus connector

ISA connectivity is facilitated with a PCI lane being connected to the ISA bus connector through the IT8888 PCI-to-ISA bridge described above.

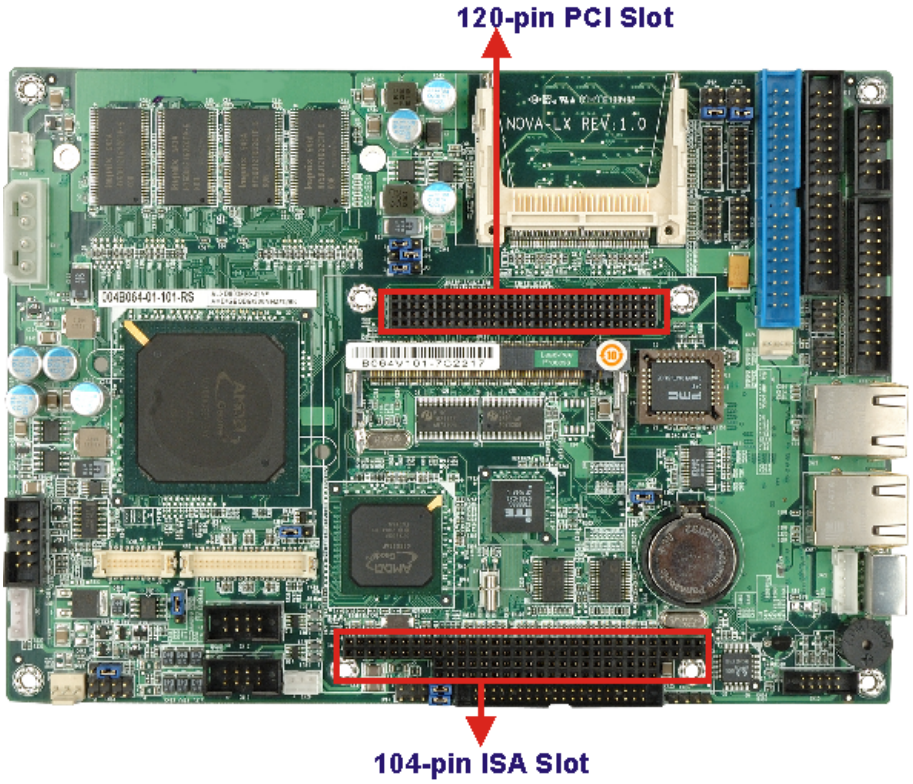


Figure 2-13: PC/104-Plus Components

2.6.6 Mini PCI

A Mini PCI slot on the board facilitates additional system expansion.

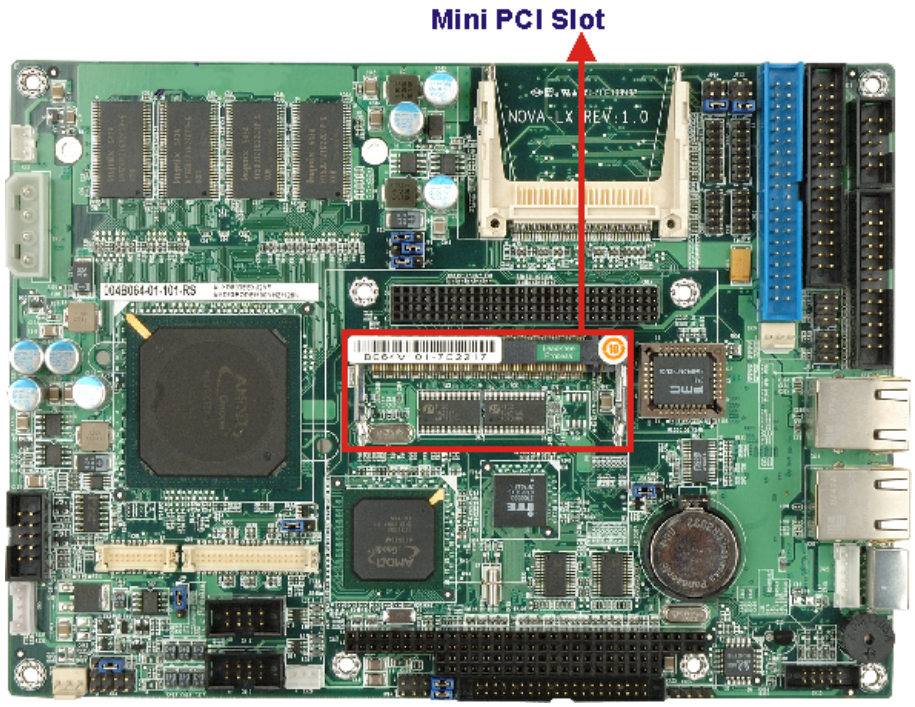


Figure 2-14: Mini PCI Slot

2.7 Environmental and Power Specifications

2.7.1 System Monitoring

Three thermal inputs on the NOVA-LX Super I/O Enhanced Hardware Monitor monitor the following temperatures:

- CPU Temperature

Eight voltage inputs on the NOVA-LX Super I/O Enhanced Hardware Monitor monitor the following volatages:

- Vcore
- VMEM
- +3.30V
- +5.00V
- +12.0V
- 5VSB

The NOVA-LX Super I/O Enhanced Hardware Monitor also monitors the following voltages internally:

- VBAT

The values for the above environmental parameters are all recorded in the BIOS Hardware Health Configuration menu.

2.7.2 Operating Temperature and Temperature Control

The maximum and minimum operating temperatures for the NOVA-LX are listed below.

- NOVA-LX800W
  - Minimum Operating Temperature: -20ºC
  - Maximum Operating Temperature: 70°C
- NOVA-LX800
  - Minimum Operating Temperature: 0ºC
  - Maximum Operating Temperature: 60°C

A cooling fan and heat sink must be installed on the CPU. Thermal paste must be smeared on the lower side of the heat sink before it is mounted on the CPU. Heat sinks are also mounted on the northbridge and southbridge chipsets to ensure the operating temperature of these chips remain low.

2.7.3 Power Consumption

Table 2-3 shows the power consumption parameters for the NOVA-LX running with a 500 MHz AMD Geode™ LX 800 processor with 256 MB of memory onboard.

Voltage	Current
+5 V	1.66 A

Table 2-3: Power Consumption

Chapter

3

Unpacking

3.1 Anti-static Precautions

WARNING:

Failure to take ESD precautions during the installation of the NOVA-LX may result in permanent damage to the NOVA-LX and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the NOVA-LX. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the NOVA-LX, or any other electrical component is handled, the following anti-static precautions are strictly adhered to.

- ***Wear an anti-static wristband***: - Wearing a simple anti-static wristband can help to prevent ESD from damaging the board.
- ***Self-grounding***:- Before handling the board touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.
- ***Use an anti-static pad***: When configuring the NOVA-LX, place it on an antic-static pad. This reduces the possibility of ESD damaging the NOVA-LX.
- ***Only handle the edges of the PCB***:-: When handling the PCB, hold the PCB by the edges.

3.2 Unpacking

3.2.1 Unpacking Precautions

When the NOVA-LX is unpacked, please do the following:

- Follow the anti-static precautions outlined in Section 3.1.
- Make sure the packing box is facing upwards so the NOVA-LX does not fall out of the box.
- Make sure all the components shown in Section 3.3 are present.

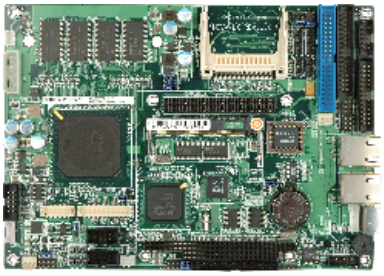
3.3 Unpacking Checklist

NOTE:

If some of the components listed in the checklist below are missing, please do not proceed with the installation. Contact the IEI reseller or vendor you purchased the NOVA-LX from or contact an IEI sales representative directly. To contact an IEI sales representative, please send an email to sales@iei.com.tw.

3.3.1 Package Contents

The NOVA-LX is shipped with the following components:

Quantity	Item and Part Number	Image
1	NOVA-LX	
1	ATA 66/100 flat cable (**P/N**: 32200-000052-RS)	
1	VGA cable (**P/N**: 32000-033800-RS)	
1	KB/MS PS/2 Y-cable (**P/N**: 32000-000138-RS)	

1	Audio cable (**P/N:** 32000-072100-RS)	
1	4 COM (wo bracket) (**P/N**: 32200-025401-RS)	
2	Dual USB cable (wo bracket) (**P/N**: 32000-044300-RS)	
1	Dual RS-232 cable (**P/N**: 19800-000051-RS)	
1	Utility CD	
1	Mini jumper pack (2.4mm) (**P/N**:33100-000079-RS) Or Mini jumper pack (2.0mm) (**P/N**:33100-000033-RS)	
1		

Table 3-1: Package List Contents

3.4 Optional Items

FDD cable (**P/N**: 32200-000017-RS)	

Parallel port cable (**P/N**:19800-000049-RS)	
RS-422/485 cable with bracket (**P/N**: 19800-000063-RS)	
4 COM (w bracket) (**P/N**: IO-KIT-4COM-R10)	
NOVA-LX-CE060	Windows CE 6.0 image and BSP S/W CD, licenses sticker (w/o CPU board)
NOVA-LX-XPE	Windows XPE image and BSP S/W CD, licenses sticker (w/o CPU board)

Table 3-2: Package List Contents

Chapter

4

Connector Pinouts

4.1 Peripheral Interface Connectors

Section 4.1.2 shows peripheral interface connector locations. Section 4.1.2 lists all the peripheral interface connectors seen in Section 4.1.2.

4.1.1 NOVA-LX Layout

Figure 4-1 shows the on-board peripheral connectors, rear panel peripheral connectors and on-board jumpers.

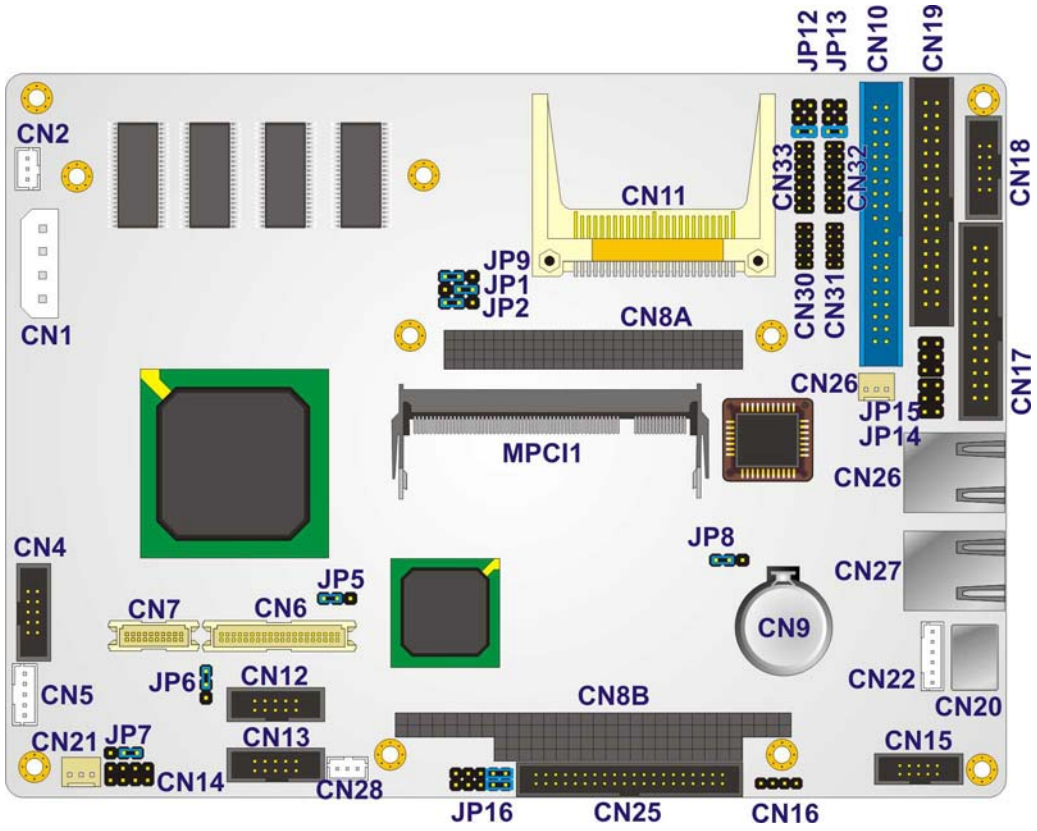


Figure 4-1: Connector and Jumper Locations

4.1.2 Peripheral Interface Connectors

Table 4-1 shows a list of the peripheral interface connectors on the NOVA-LX. Detailed descriptions of these connectors can be found below.

Connector	Type	Label
ATX +12V power connector	4-pin ATX	CN1
ATX power supply enable connector	3-pin wafer	CN2
Audio CD In	4-pin header	CN16
Audio connector	10-pin header	CN15
Backlight inverter connector	5-pin wafer	CN5
Battery connector	2-pin wafer	CN9
Batter connector (LX800W models)	3-pin wafer	CN24
Cooling fan connector	3-pin wafer	CN211
Floppy disk connector	34-pin box header	CN19
Front panel connector	8-pin header	CN14
GPIO connector	10-pin header	CN18
IDE connector	44-pin box header	CN10
Keyboard and mouse connector	6-pin wafer	CN22
LVDS connector	20-pin crimp	CN7
Parallel port connector	26-pin box header	CN17
PC/104-Plus power connector	3-pin header	CN28
Serial port connector (COM1, COM2)	10-pin header	CN30
Serial port connector (COM3)	14-pin header	CN32
Serial port connector (COM4)	14-pin header	CN33
Serial port connector (COM5 – COM8)	40-pin header	CN25
TTL connector	40-pin crimp	CN6
USB connectors	8-pin header	CN12
USB connectors	8-pin header	CN13

VGA connector	10-pin box header	CN4

Table 4-1: Peripheral Interface Connectors

4.1.3 External Interface Panel Connectors

Table 4-2 lists the rear panel connectors on the NOVA-LX. Detailed descriptions of these connectors can be found in **Section 4.2.20** on **page 65**

Connector	Type	Label
Keyboard and mouse connector	PS/2	CN20
Ethernet connector	RJ-45	CN26
Ethernet connector	RJ-45	CN27

Table 4-2: Rear Panel Connectors

4.2 Internal Peripheral Connectors

Internal peripheral connectors are found on the motherboard and are only accessible when the motherboard is outside of the chassis. This section has complete descriptions of all the internal, peripheral connectors on the NOVA-LX.

4.2.1 ATX +12V Power Connector

CN Label: CN1

CN Type: 4-pin ATX power connector (1x4)

CN Location: See Figure 4-2

CN Pinouts: See Table 4-3

The 4-pin ATX power connector is connected to an ATX power supply.

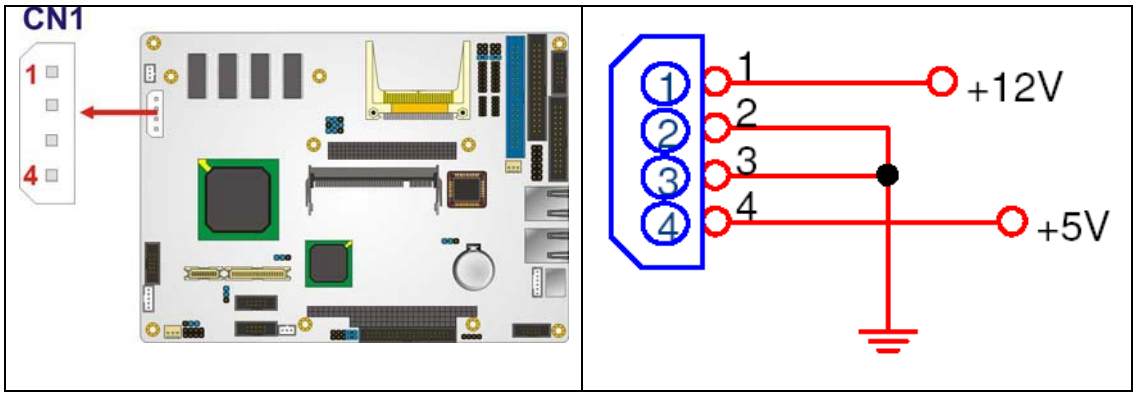


Figure 4-2: ATX Power Connector Location

PIN NO.	DESCRIPTION
1	+12 V
2	GND
3	GND
4	+5 V

Table 4-3: ATX Power Connector Pinouts

4.2.2 ATX Power Supply Enable Connector

CN Label: **CN2**

CN Type: 3-pin wafer (1x3)

CN Location: See **Figure 4-3**

CN Pinouts: See **Table 4-4**

The ATX power supply enable connector enables the NOVA-LX to be connected to an ATX power supply. In default mode, the NOVA-LX can only us an AT power supply. To enable an ATX power supply the AT Power Select jumper must also be configured. Please refer to Chapter 3 for more details.

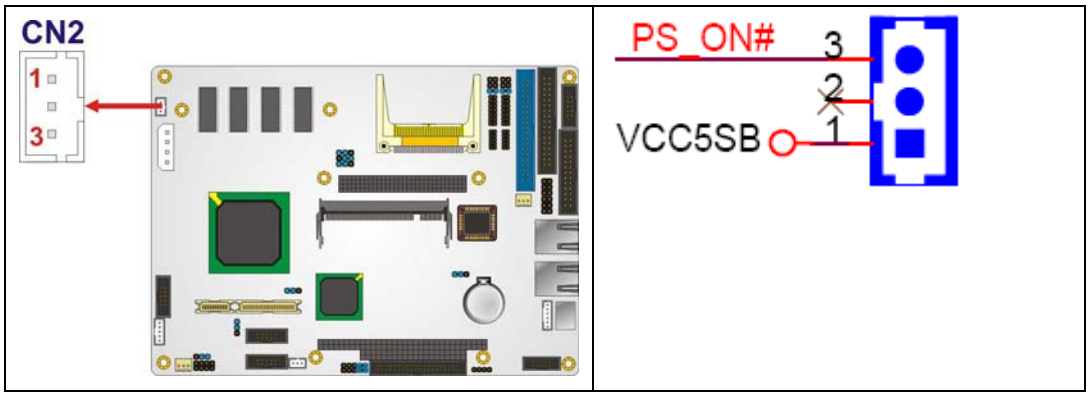


Figure 4-3: ATX Power Supply Enable Connector Location

PIN NO.	DESCRIPTION
1	+5 V Standby
2	No connection
3	PS-ON

Table 4-4: ATX Power Supply Enable Connector Pinouts

4.2.3 Audio CD In Connector (4-pin)

CN Label: CN16

CN Type: 4-pin header

CN Location: See Figure 4-4

CN Pinouts: See Table 4-5

The 4-pin audio CD in connector is connected to an external audio CD device for the input and output of audio signals from a CD player to the system.

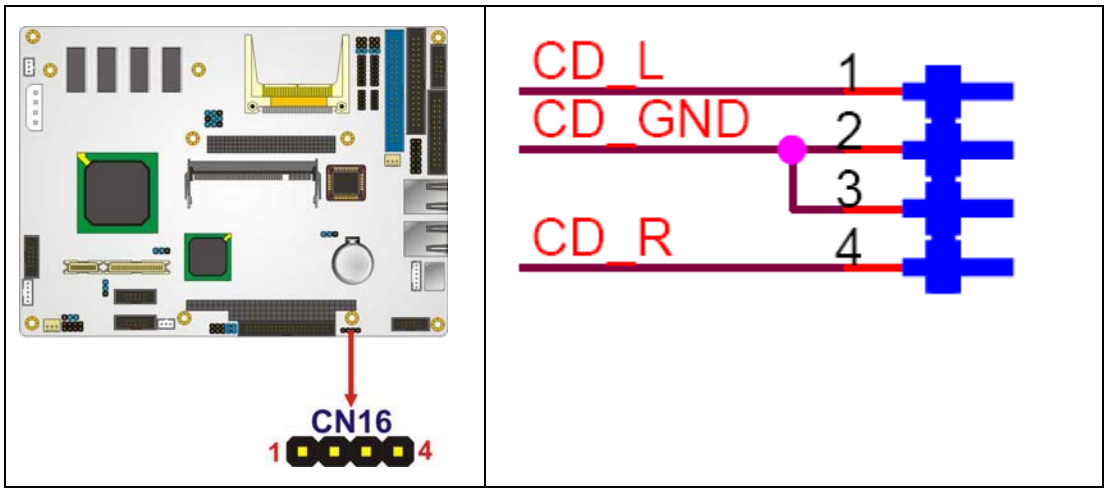


Figure 4-4: Audio CD In Connector Pinouts (4-pin)

PIN NO.	DESCRIPTION
1	CD Signal (Left)
2	Ground
3	Ground
4	CD Signal (Right)

Table 4-5: Audio CD In Connector Pinouts

4.2.4 Audio Connector (10-pin)

CN Label: **CN15**

CN Type: 10-pin header

CN Location: See **Figure 4-5**

CN Pinouts: See **Table 4-6**

The 10-pin audio connector is connected to external audio devices including speakers and microphones for the input and output of audio signals to and from the system.

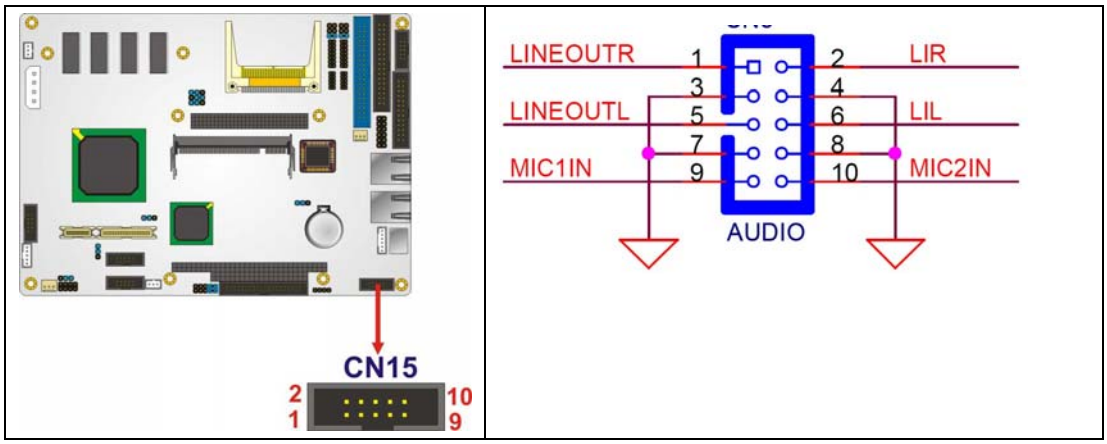


Figure 4-5: Audio Connector Pinouts (10-pin)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	Line out R	2	Line in R
3	GND	4	GND
5	Line out L	6	Line in L
7	GND	8	GND
9	MIC1 in	10	MIC2 in

Table 4-6: Audio Connector Pinouts (10-pin)

4.2.5 Backlight Inverter Connector

CN Label: **CN5**

CN Type: 5-pin wafer (1x5)

CN Location: See **Figure 4-6**

CN Pinouts: See **Table 4-7**

The backlight inverter connector provides the backlight on the LCD display connected to the NOVA-LX with +12V of power.

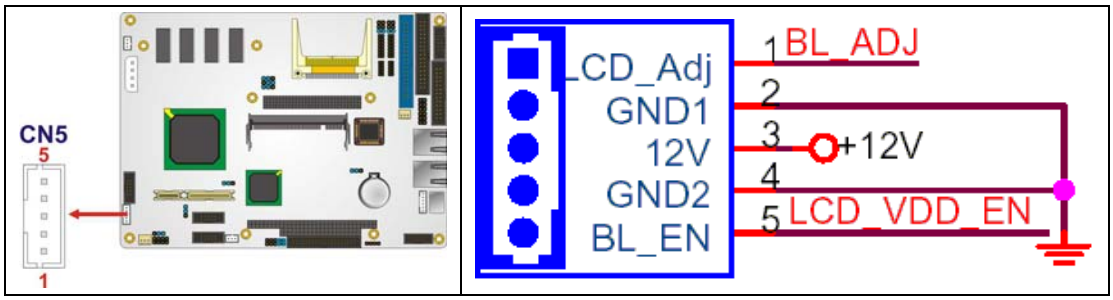


Figure 4-6: Panel Backlight Connector Pinout Locations

PIN NO.	DESCRIPTION
1	BL_ADJ
2	GND
3	12V
4	GND
5	VDD_EN

Table 4-7: Panel Backlight Connector Pinouts

4.2.6 Fan Connector (+12V) (System Cooling Fans)

CN Label: CN21

CN Type: 3-pin wafer

CN Location: See Figure 4-7

CN Pinouts: See Table 4-8

Two system cooling fan connectors provide a 12V, 500mA current to two system cooling fans. The connectors have a "rotation" pin to get rotation signals from fans and notify the system so the system BIOS can recognize the fan speed. Please note that only specified fans can issue the rotation signals.

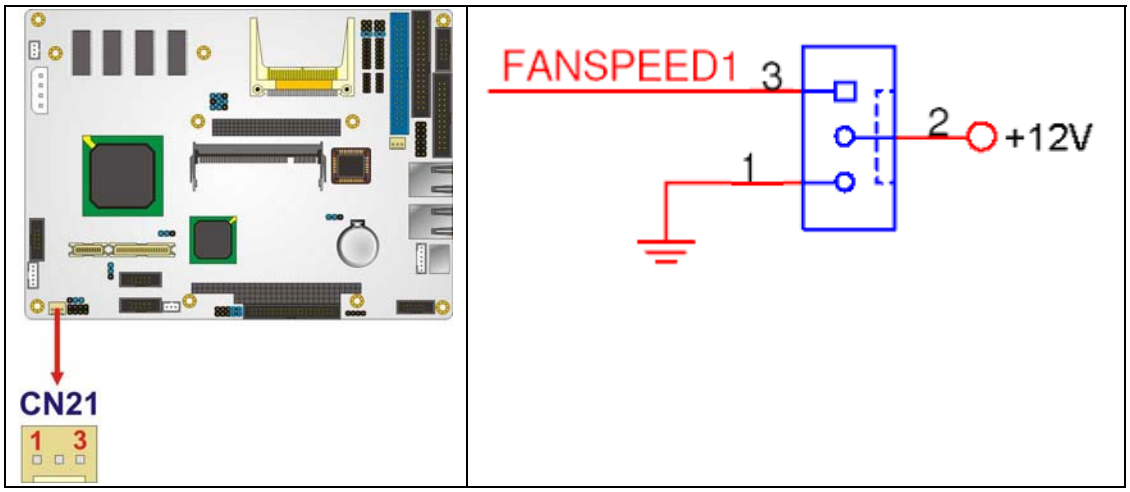


Figure 4-7: +12V Fan Connector Location

PIN NO.	DESCRIPTION
1	GND
2	+12V
3	Fan Speed Detect

Table 4-8: +12V Fan Connector Pinouts

4.2.7 Floppy Disk Connector (34-pin)

CN Label: **CN19**

CN Type: 34-pin header (2x17)

CN Location: See **Figure 4-8**

CN Pinouts: See **Table 4-9**

The floppy disk connector is connected to a floppy disk drive.

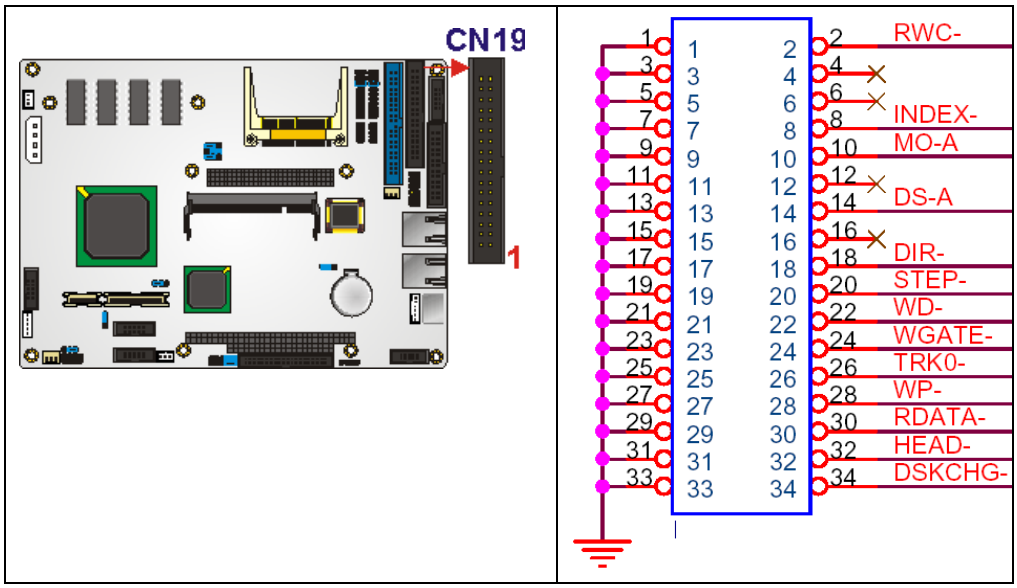


Figure 4-8: 34-pin FDD Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	REDUCE WRITE
3	GND	4	N/C
5	GND	6	N/C
7	GND	8	INDEX#
9	GND	10	MOTOR ENABLE A#
11	GND	12	N/C
13	GND	14	DRIVE SELECT A#
15	GND	16	N/C
17	GND	18	DIRECTION#
19	GND	20	STEP#
21	GND	22	WRITE DATA#
23	GND	24	WRITE GATE#
25	GND	26	TRACK 0#
27	GND	28	WRITE PROTECT#

29	GND	30	READ DATA#
31	GND	32	SIDE 1 SELECT#
33	GND	34	DISK CHANGE#

Table 4-9: 34-pin FDD Connector Pinouts

4.2.8 Front Panel Connector (8-pin)

CN Label: CN14

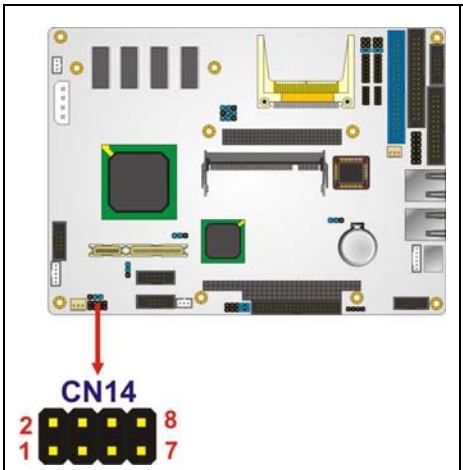
CN Type: 14-pin header (2x7)

CN Location: See Figure 4-9

CN Pinouts: See Table 4-10

The front panel connector connects to external switches and indicators to monitor and controls the motherboard. These indicators and switches include:

- Power button
- Reset
- HDD LED



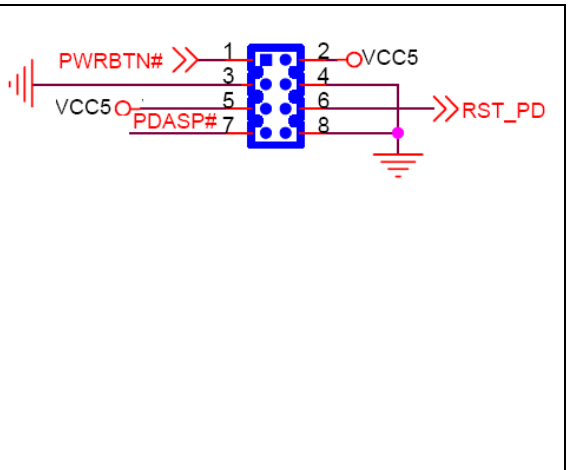


Figure 4-9: Front Panel Connector Pinout Locations (8-pin)

FUNCTION	PIN	DESCRIPTION	FUNCTION	PIN	DESCRIPTION
Power Button	1	PWR_BTN	Reset Button	2	VCC5
	3	GND		4	GND
HDD LED	5	HDD_LED+		6	RESET
	7	HDD_LED-		8	GND

Table 4-10: Front Panel Connector Pinouts (8-pin)

4.2.9 GPIO Connector

CN Label: **CN18**

CN Type: 10-pin header (2x5)

CN Location: See **Figure 4-10**

CN Pinouts: See **Table 4-11**

The GPIO connector can be connected to external I/O control devices including sensors, lights, alarms and switches.

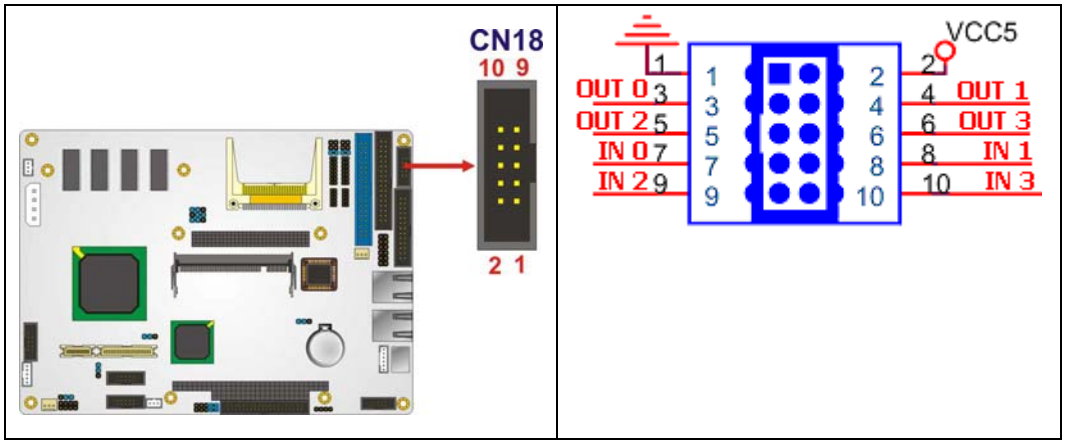


Figure 4-10: GPIO Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	VCC5
3	OUT 0	4	OUT 1

5	OUT 2	6	OUT 3
7	IN 0	8	IN 0
9	IN 2	10	IN 3

Table 4-11: GPIO Connector Pinouts

4.2.10 IDE Connector(40-pin)

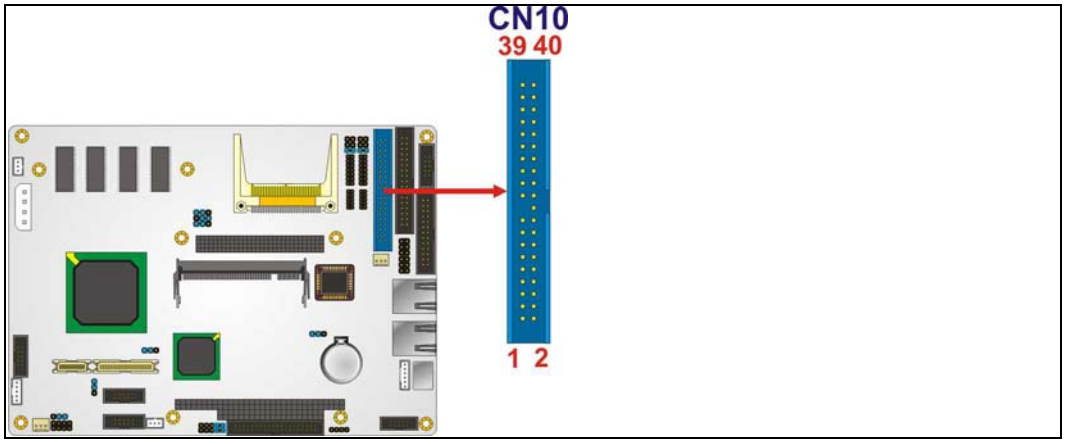
CN Label: CN10

CN Type: 40-pin header (2x20)

CN Location: See Figure 4-11

CN Pinouts: See Table 4-12

One 40-pin IDE device connector on the NOVA-LX supports connectivity to two hard disk drives.



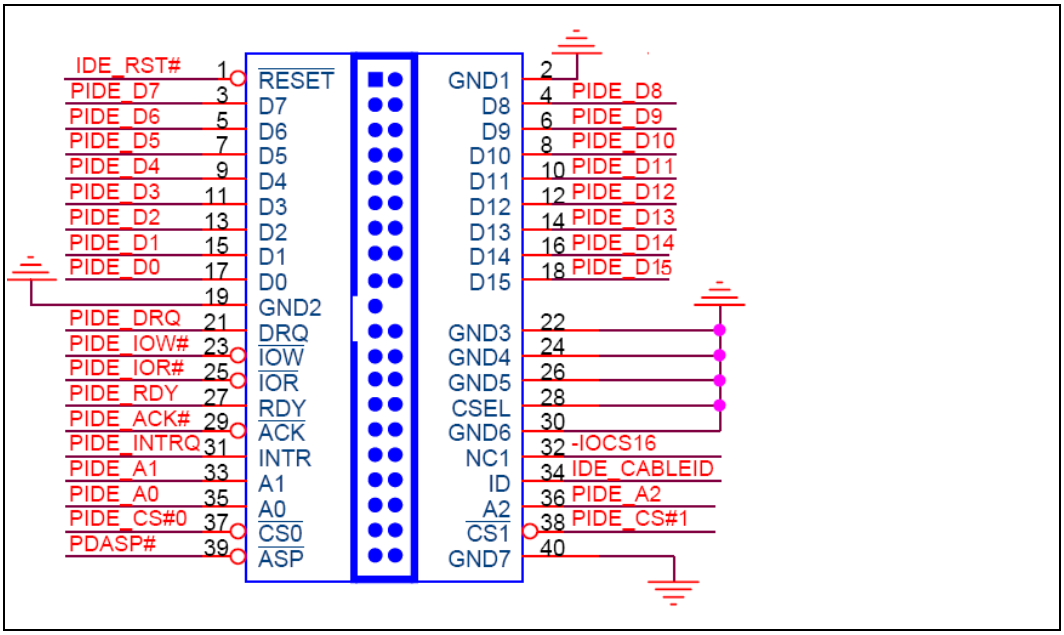


Figure 4-11: Secondary IDE Device Connector Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	RESET#	2	GROUND
3	DATA 7	4	DATA 8
5	DATA 6	6	DATA 9
7	DATA 5	8	DATA 10
9	DATA 4	10	DATA 11
11	DATA 3	12	DATA 12
13	DATA 2	14	DATA 13
15	DATA 1	16	DATA 14
17	DATA 0	18	DATA 15
19	GROUND	20	N/C
21	IDE DRQ	22	GROUND
23	IOW#	24	GROUND
25	IOR#	26	GROUND
27	IDE CHRDY	28	GROUND
29	IDE DACK	30	GROUND–DEFAULT
31	INTERRUPT	32	IOCS16
33	SA1	34	IDE_CABLEID

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
35	SA0	36	SA2
37	HDC CS0#	38	HDC CS1#
39	HDD ACTIVE#	40	GROUND

Table 4-12: Secondary IDE Connector Pinouts

4.2.11 Keyboard/Mouse Connector

CN Label: **CN22**

CN Type: 6-pin header (1x6)

CN Location: See **Figure 4-12**

CN Pinouts: See **Table 4-13**

The keyboard and mouse connector can be connected to a standard PS/2 cable or PS/2 Y-cable to add keyboard and mouse functionality to the system.

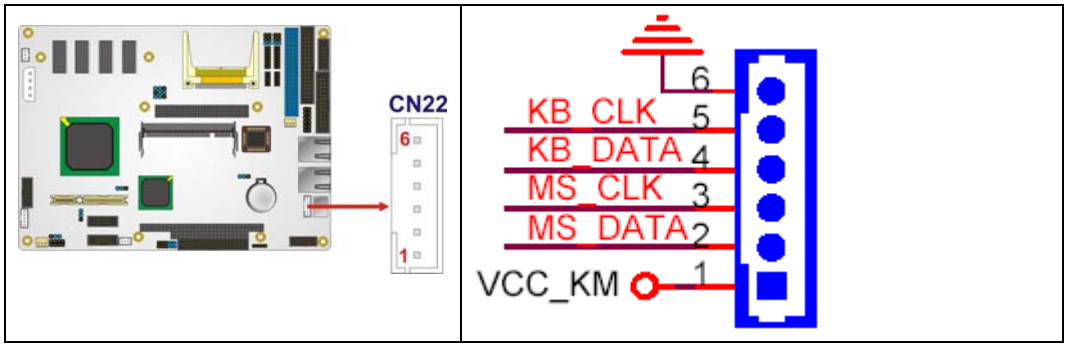


Figure 4-12: Keyboard/Mouse Connector Location

PIN NO.	DESCRIPTION
1	+5V KB DATA
2	MS DATA
3	MS CLK
4	KB DATA
5	KB CLK
6	GROUND

Table 4-13: Keyboard/Mouse Connector Pinouts

4.2.12 LVDS LCD Connector

CN Label: **CN7**

CN Type: 20-pin crimp (2x10)

CN Location: See **Figure 4-13**

CN Pinouts: See **Table 4-14**

The 30-pin LVDS LCD connector can be connected to single channel or dual channel, 18-bit or 36-bit LVDS panel.

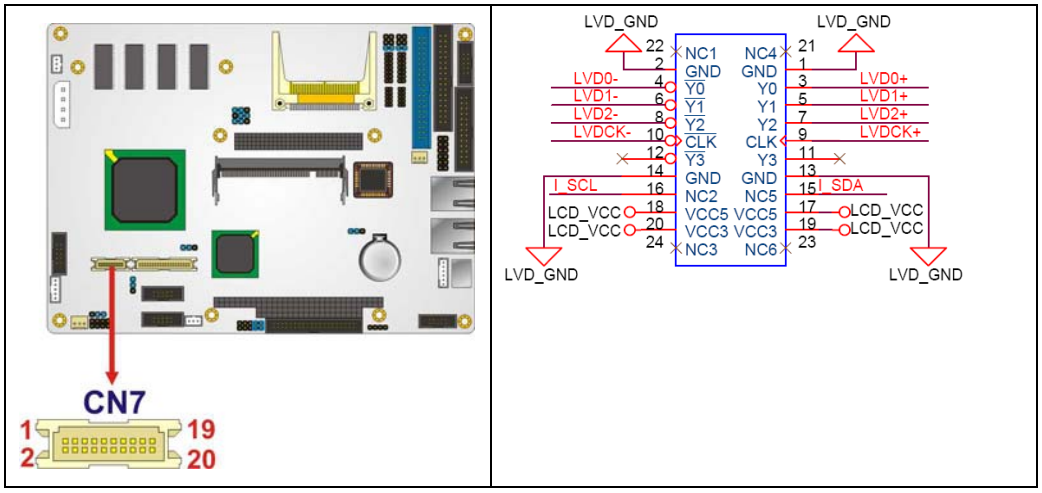


Figure 4-13: LVDS LCD Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GROUND	2	GROUND
3	LVDSA_Y0+	4	LVDSA_Y0-
5	LVDSA_Y1+	6	LVDSA_Y1-
7	LVDSA_Y2+	8	LVDSA_Y2-
9	LVDSA_CLK+	10	LVDSA_CLK-
11	N/C	12	N/C
13	GROUND	14	GROUND

15	I_SDA	16	I_SCL
17	LCD_VCC	18	LCD_VCC
19	LCD_VCC	20	LCD_VCC

Table 4-14: LVDS LCD Port Connector Pinouts

4.2.13 Parallel Port Connector

CN Label: **CN17**

CN Type: 26-pin box header

CN Location: See **Figure 4-14**

CN Pinouts: See **Table 4-15**

The 26-pin parallel port connector connects to a parallel port connector interface or some other parallel port device such as a printer.

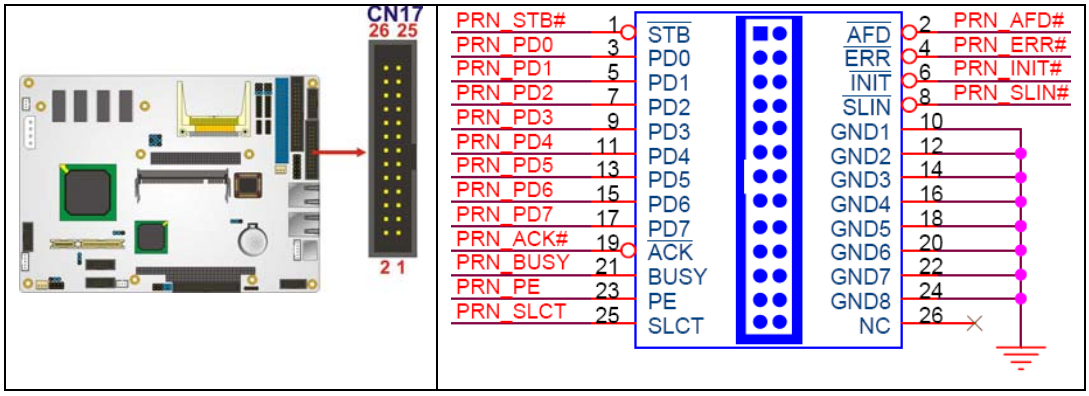


Figure 4-14: Parallel Port Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	STROBE#	2	AFD
3	DATA 0	4	ERR
5	DATA 1	6	INIT
7	DATA 2	8	SLIN
9	DATA 3	10	GROUND
11	DATA 4	12	GROUND

13	DATA 5	14	GROUND
15	DATA 6	16	GROUND
17	DATA 7	18	GROUND
19	ACK	20	GROUND
21	BUSY	22	GROUND
23	PE	24	GROUND
25	SELECT	26	NC

Table 4-15: Parallel Port Connector Pinouts

4.2.14 PC/104 Power Input Connector

CN Label: **CN28**

CN Type: 3-pin wafer (1x3)

CN Location: See **Figure 4-15**

CN Pinouts: See **Table 4-16**

The PC/104 power input connector provides power to the PC/104 expansion module installed on the PC/104 slot.

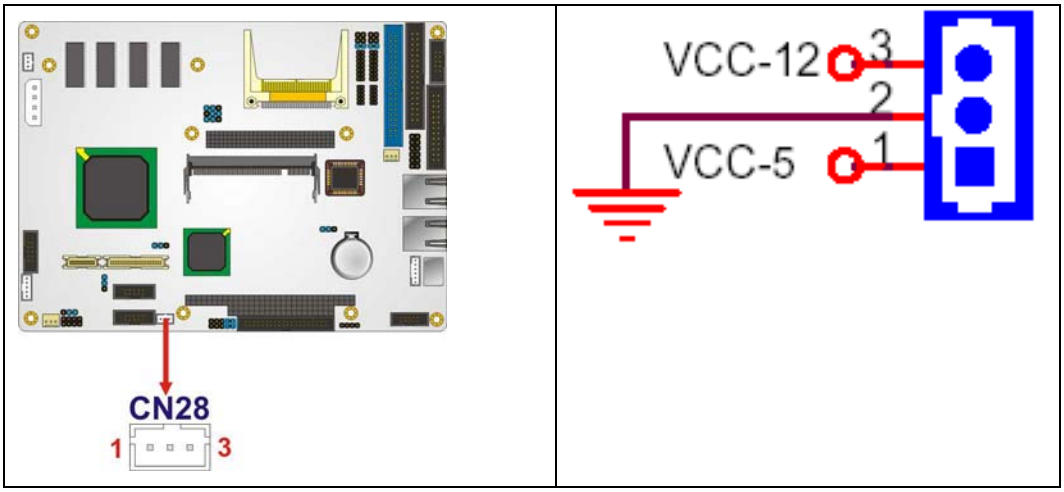


Figure 4-15: PC/104 Power Input Connector Pinouts

PIN NO.	DESCRIPTION

1	-5V
3	GND
5	-12V

Table 4-16: PC/104 Power Input Connector Pinouts

4.2.15 Serial Port Connectors (COM1, COM2)

CN Label: CN30 and CN31

CN Type: 10-pin header (2x5)

CN Location: See Figure 4-16

CN Pinouts: See Table 4-17

The four 10-pin serial port connectors provide four additional RS-232 serial communications channels. The four internal RS-232 serial port connectors can be connected to external RS-232 serial port devices.

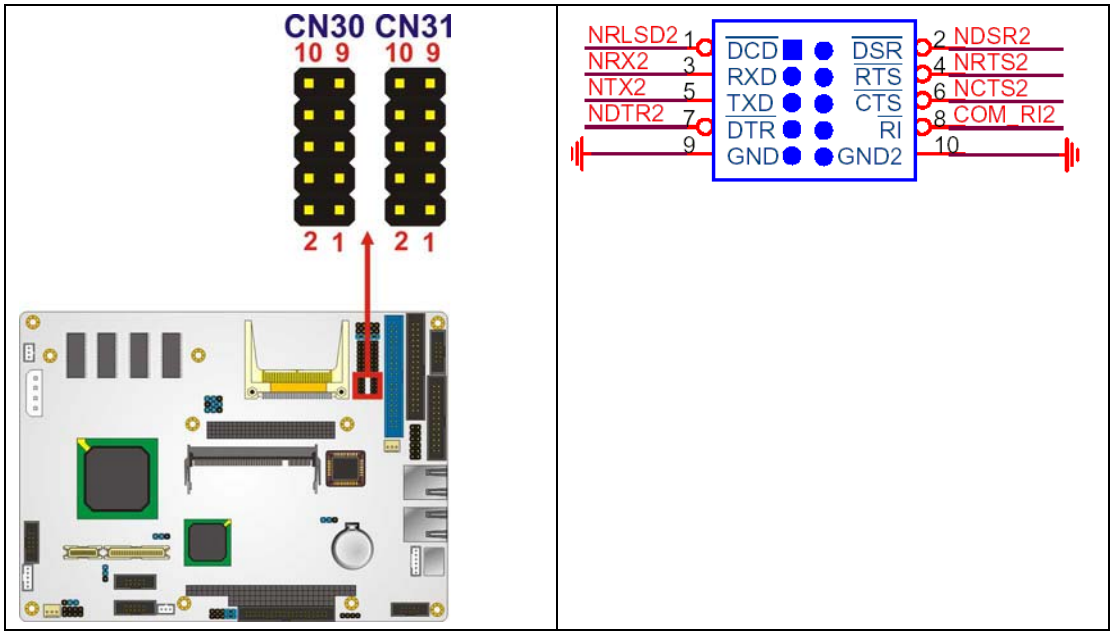


Figure 4-16: RS-232 COM Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	Data Carrier Direct (DCD)	2	Data Set Ready (DSR)

3	Receive Data (RXD)	4	Request To Send (RTS)
5	Transmit Data (TXD)	6	Clear To Send (CTS)
7	Data Terminal Ready (DTR)	8	Ring Indicator (RI)
9	Ground (GND)	10	Ground (GND)

Table 4-17: RS-232 COM Connector Pinouts

4.2.16 Serial Port Connector (COM3 and COM4)(RS-232, RS-422 or RS-485)

CN Label: CN32, CN33

CN Type: 14-pin header (2x7)

CN Location: See Figure 4-17

CN Pinouts: See Table 4-18

The 14-pin serial port connector connects to the COM3 and COM4 serial communications channels. COM3 and COM4 are multi function channels. In default mode COM3 and COM4 are RS-232 serial communication channels but, with the COM3 and COM4 function select jumpers, can be configured as either an RS-422 or RS-485 serial communications channel.

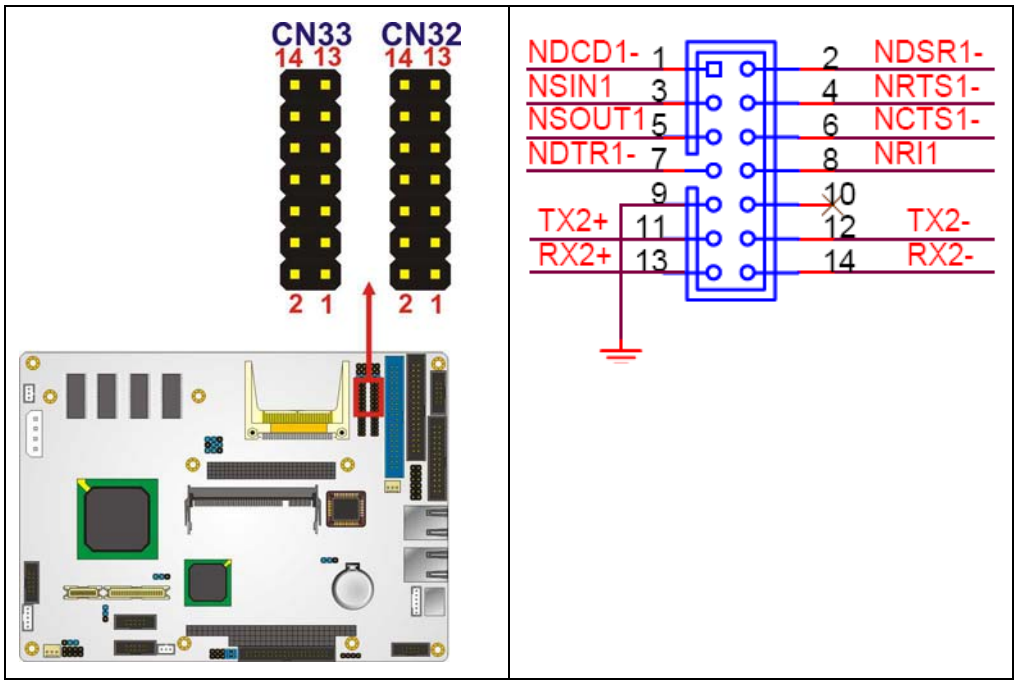


Figure 4-17: RS-232/422/485 Serial Port Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD	2	DSR
3	RXD	4	RTS
5	TXD	6	CTS
7	DTR	8	RI
9	GND	10	GND
11	TXD485+	12	TXD485-
13	RXD485+	14	RXD485-

Table 4-18: RS-232/RS-485 Serial Port Connector Pinouts

4.2.17 Serial Port Connector (COM 5, COM 6, COM 7 and COM 8)

CN Label: **CN25**

CN Type: 40-pin header (2x20)

CN Location: See Figure 4-18

CN Pinouts: See Table 4-19

The 40-pin serial port connector contains the following four serial ports, COM 5, COM 6, COM 7 and COM 8. All four serial ports are RS-232 serial communications channels. The serial port locations are specified below.

- COM 5 is located on pin 1 to pin 10
- COM 6 is located on pin 11 to pin 20
- COM 7 is located on pin 21 to pin 30
- COM 8 is located on pin 31 to pin 40

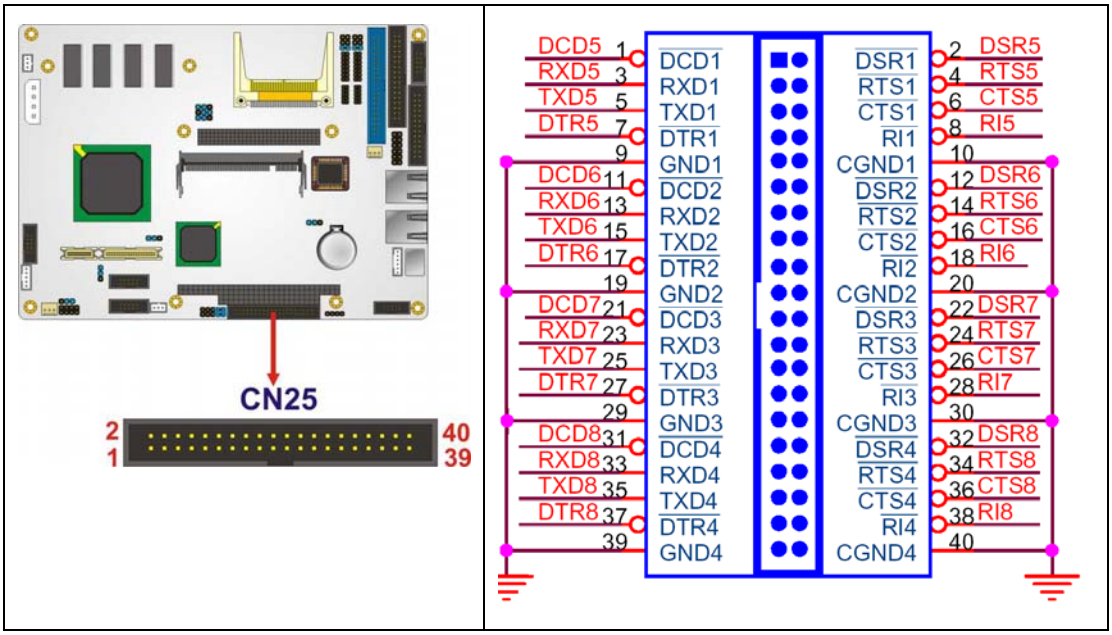


Figure 4-18: COM 2 to COM 4 Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD5	2	DSR5
3	RXD5	4	RTS5
5	TXD5	6	CTS5
7	DTR5	8	RI5
9	GND	10	GND
11	DCD6	12	DSR6
13	RXD6	14	RTS6
15	TXD6	16	CTS6
17	DTR6	18	RI6

19	GND	20	GND
21	DCD7	22	DSR7
23	RXD7	24	RTS7
25	TXD7	26	CTS7
27	DTR7	28	RI7
29	GND	30	GND
31	DCD8	32	DSR8
33	RXD8	34	RTS8
35	TXD8	36	CTS8
37	DTR8	38	RI8
39	GND	40	GND

Table 4-19: COM 2 to COM 4 Connector Pinouts

4.2.18 TFT LCD TTL Connector

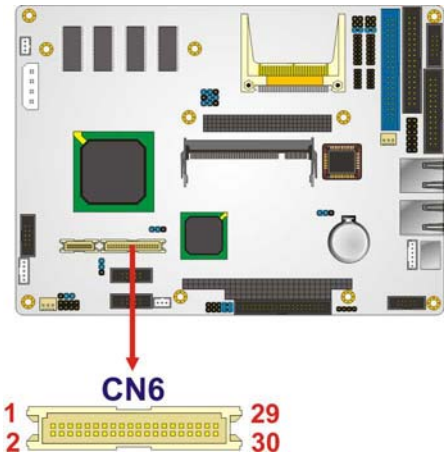
CN Label: **CN6**

CN Type: 40-pin crimp (2x20)

CN Location: See **Figure 4-19**

CN Pinouts: See **Table 4-20**

The TFT LCD LVDS can be connected to a TFT LCD screen directly.



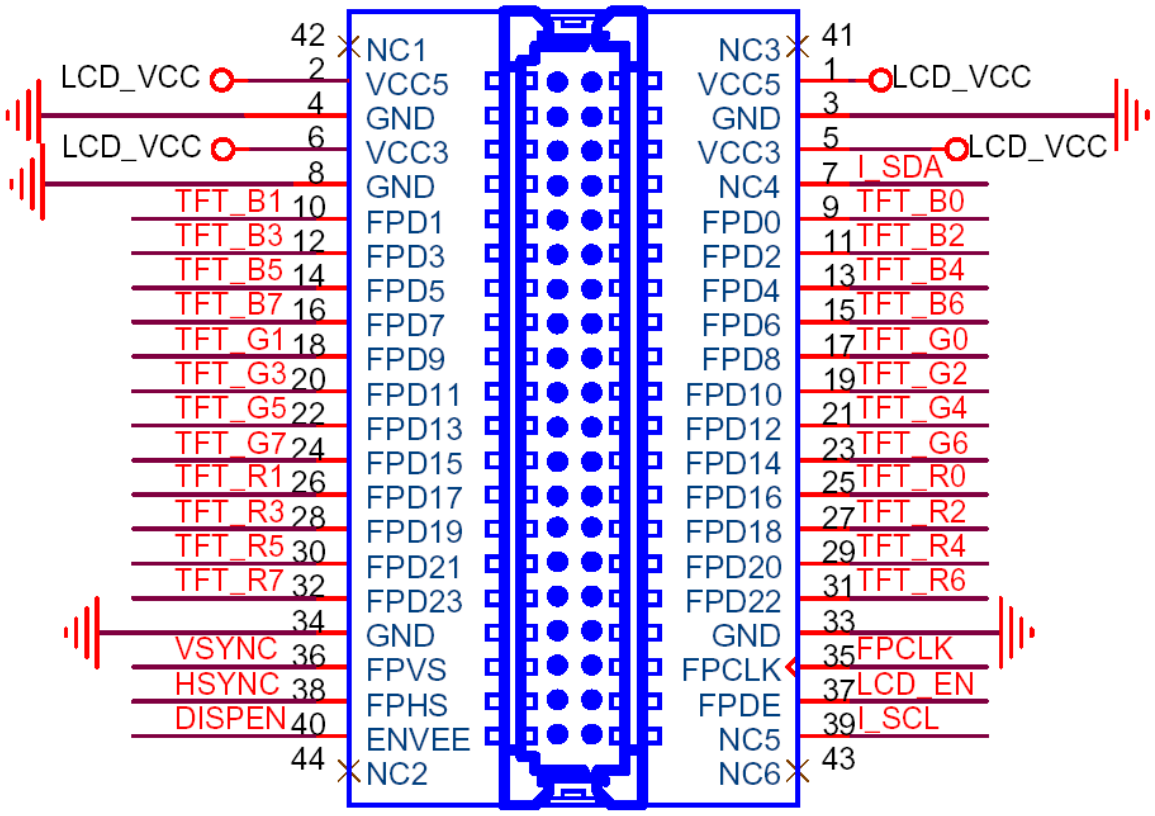


Figure 4-19: TFT LCD TTL Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	LCD_Vcc	2	LCD_Vcc
3	GND	4	GND
5	LCD_Vcc	6	LCD_Vcc
7	SDA	8	GND
9	B0	10	B1
11	B2	12	B3
13	B4	14	B5
15	B6	16	B7
17	G0	18	G1
19	G2	20	G3
21	G4	22	G5
23	G6	24	G7

25	R0	26	R1
26	R2	28	R3
29	R4	30	R5
31	R6	32	R7
33	GND	34	GND
35	CLK	36	VSYNC
37	LCD_EN	38	HSYNC
39	SCL	40	DISP_EN

Table 4-20: TFT LCD TTL Port Connector Pinouts

4.2.19 USB Connectors (Internal)

CN Label: CN12 and CN13

CN Type: 8-pin header (2x4)

CN Location: See Figure 4-20

CN Pinouts: See Table 4-21

The 2x4 USB pin connectors each provide connectivity to two USB 1.1 or two USB 2.0 ports. Each USB connector can support two USB devices. Additional external USB ports are found on the rear panel. The USB ports are used for I/O bus expansion.

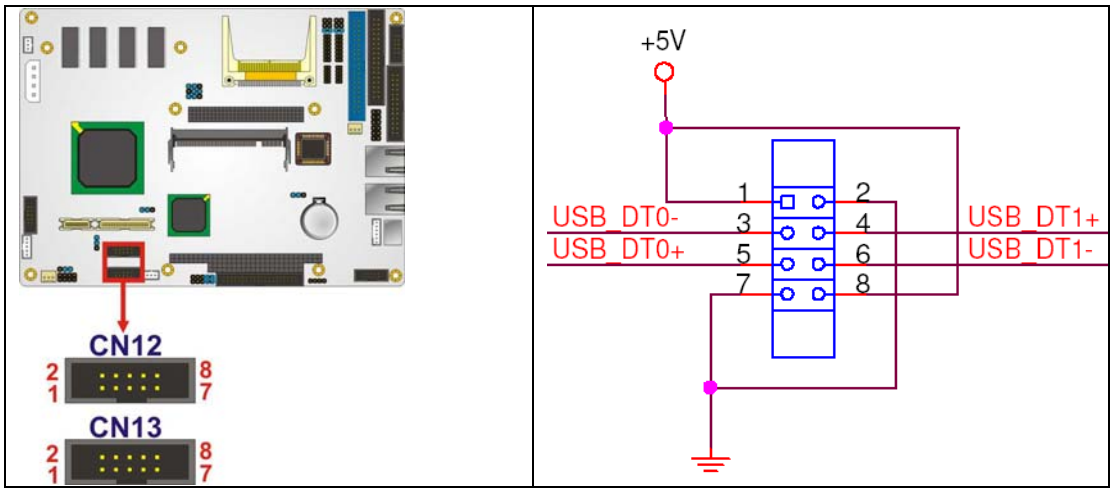


Figure 4-20: USB Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC	2	GND
3	DATAN-	4	DATAM+
5	DATAN+	6	DATAN-
7	GND	8	VCC

Table 4-21: USB Port Connector Pinouts

4.2.20 VGA Connectors (Internal)

CN Label: CN4

CN Type: 10-pin box header (2x4)

CN Location: See **Figure 4-21**

CN Pinouts: See **Table 4-22**

The 2x5 VGA pin connector provides connectivity to an external VGA port enabling the system to be connected to a standard CRT screen.

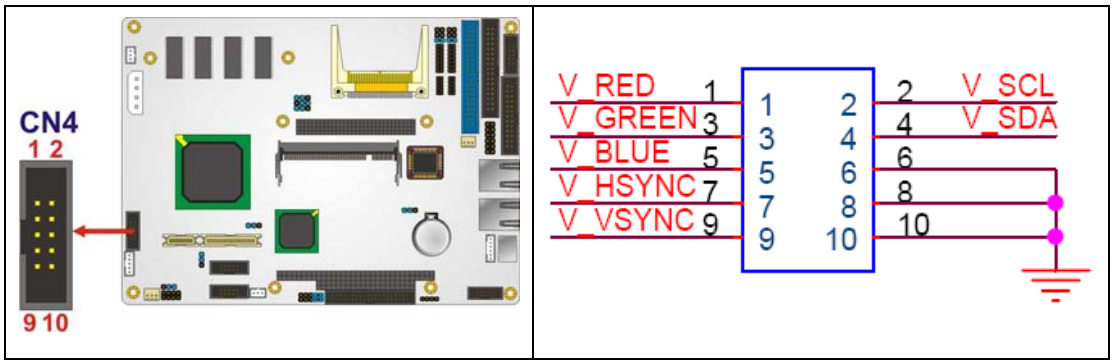


Figure 4-21: VGA Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	L_RED	2	SCL
3	L_GREEN	4	SDA
5	L_BLUE	6	GND
7	5VHSYNC	8	GND

9	5VVSYNC	8	GND

Table 4-22: VGA Connector Pinouts

4.3 External Peripheral Interface Connectors

The external peripheral interface connectors on the back panel are connected to devices externally when the NOVA-LX is installed in a chassis. The peripheral connectors on the rear panel are:

- 1 x Keyboard/mouse connector
- 2 x RJ-45 Ethernet connector

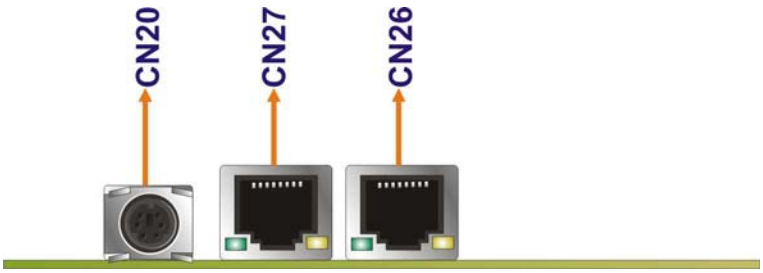


Figure 4-22: NOVA-LX External Interface Connectors

4.3.1 Keyboard/Mouse Connector

CN Label: CN20

CN Type: PS/2

CN Location: See Figure 4-22

CN Pinouts: See Table 4-23

The PCIE-9450 keyboard and mouse connector is a standard PS/2 connector.

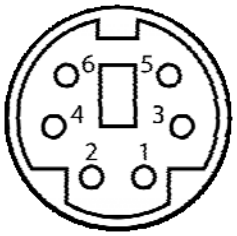


Figure 4-23: PS/2 Pinout and Configuration

PIN	DESCRIPTION
1	KB DATA
2	MS DATA
3	GND
4	VCC
5	KB CLOCK
6	MS CLOCK

Table 4-23: Keyboard Connector Pinouts

4.3.2 LAN Connectors

CN Label: CN26 and CN27

CN Type: RJ-45

CN Location: Figure 4-22

CN Pinouts: Table 4-24

The NOVA-LX is equipped with two built-in RJ-45 Ethernet controllers. The controllers can connect to the LAN through two RJ-45 LAN connectors. There are two LEDs on the connector indicating the status of LAN. The pin assignments are listed in the following table:

PIN	DESCRIPTION	PIN	DESCRIPTION
1	TXA+	5	TXC-
2	TXA-	6	TXB-
3	TXB+	7	TXD+

4	TXC+	8	TXD-

Table 4-24: LAN Pinouts

Figure 4-24: RJ-45 Ethernet Connector

The RJ-45 Ethernet connector has two status LEDs, one green and one yellow. The green LED indicates activity on the port and the yellow LED indicates the port is linked. See **Table 4-25**.

STATUS	DESCRIPTION	STATUS	DESCRIPTION
YELLOW	Activity	GREEN	Linked

Table 4-25: RJ-45 Ethernet Connector LEDs

Chapter

5

Installation

5.1 Anti-static Precautions

WARNING:

Failure to take ESD precautions during the installation of the NOVA-LX may result in permanent damage to the NOVA-LX and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the NOVA-LX. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the NOVA-LX, or any other electrical component is handled, the following anti-static precautions are strictly adhered to.

- ***Wear an anti-static wristband***: - Wearing a simple anti-static wristband can help to prevent ESD from damaging the board.
- ***Self-grounding***:- Before handling the board touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.
- ***Use an anti-static pad***: When configuring the NOVA-LX, place it on an antic-static pad. This reduces the possibility of ESD damaging the NOVA-LX.
- ***Only handle the edges of the PCB***:-: When handling the PCB, hold the PCB by the edges.

5.2 Installation Considerations

NOTE:

The following installation notices and installation considerations should be read and understood before the NOVA-LX is installed. All installation notices pertaining to the installation of the NOVA-LX should be strictly adhered to. Failing to adhere to these precautions may lead to severe damage of the NOVA-LX and injury to the person installing the motherboard.

5.2.1 Installation Notices

WARNING:

The installation instructions described in this manual should be carefully followed in order to prevent damage to the NOVA-LX, NOVA-LX components and injury to the user.

Before and during the installation please **DO** the following:

- Read the user manual:
  - The user manual provides a complete description of the NOVA-LX installation instructions and configuration options.
- Wear an electrostatic discharge cuff (ESD):
  - Electronic components are easily damaged by ESD. Wearing an ESD cuff removes ESD from the body and helps prevent ESD damage.
- Place the NOVA-LX on an antistatic pad:
  - When installing or configuring the motherboard, place it on an antistatic pad. This helps to prevent potential ESD damage.
- Turn all power to the NOVA-LX off:

- When working with the NOVA-LX, make sure that it is disconnected from all power supplies and that no electricity is being fed into the system.

Before and during the installation of the NOVA-LX **DO NOT:**

- Remove any of the stickers on the PCB board. These stickers are required for warranty validation.
- Use the product before verifying all the cables and power connectors are properly connected.
- Allow screws to come in contact with the PCB circuit, connector pins, or its components.

5.2.2 Installation Checklist

The following checklist is provided to ensure the NOVA-LX is properly installed.

- All the items in the packing list are present
- The CPU is installed
- The CPU cooling kit is properly installed
- A compatible memory module is properly inserted into the slot
- The CF Type I or CF Type II card is properly installed into the CF socket
- The jumpers have been properly configured
- The NOVA-LX is inserted into a chassis with adequate ventilation
- The correct power supply is being used
- The following devices are properly connected
  - Primary and secondary IDE device
  - Power supply
  - USB cables
  - Serial port cables
  - VGA cable
- The following external peripheral devices are properly connected to the chassis:
  - Keyboard
  - Parallel port device (printer)
  - LAN connection

5.3 Unpacking

5.3.1 Unpacking Precautions

When the NOVA-LX is unpacked, please do the following:

- Follow the anti-static precautions outlined in Section 5.1.
- Make sure the packing box is facing upwards so the NOVA-LX does not fall out of the box.
- Make sure all the components in the checklist shown in **Chapter 3** are present.

NOTE:

If some of the components listed in the checklist in **Chapter 3** are missing, please do not proceed with the installation. Contact the IEI reseller or vendor you purchased the NOVA-LX from or contact an IEI sales representative directly. To contact an IEI sales representative, please send an email to sales@iei.com.tw.

5.4 CF Card Installation

NOTE:

The NOVA-LX can support both CF Type I cards and CF Type II cards. For the complete specifications of the supported CF cards please refer to **Chapter 2**.

To install the a CF card (Type 1 or Type 2) onto the NOVA-LX, please follow the steps below:

Step 1: **Locate the CF card socket**. Place the NOVA-LX on an anti-static pad with the solder side facing up. Locate the CF card.

Step 2: **Align the CF card**. Make sure the CF card is properly aligned with the CF socket.

Step 3: **Insert the CF card**. Gently insert the CF card into the socket making sure the socket pins are properly inserted into the socket. See **Figure 5-1**.

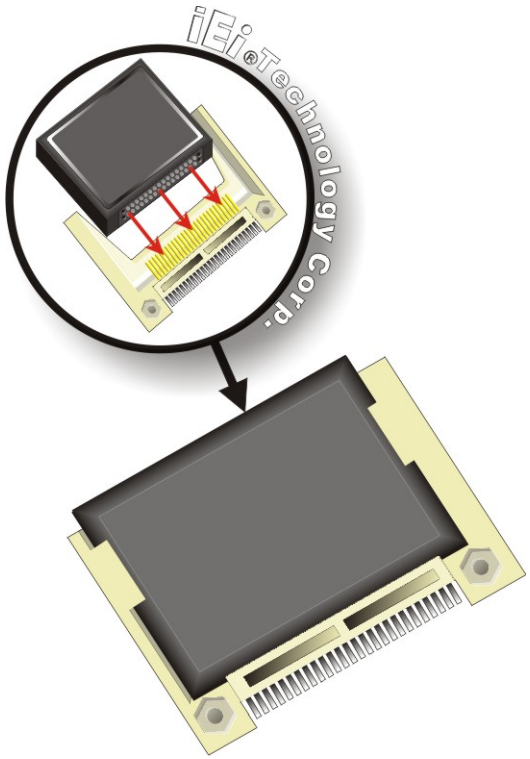
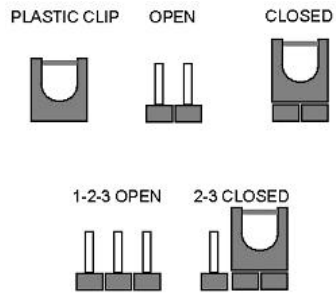


Figure 5-1: CF Card Installation

5.5 Jumper Settings

NOTE:

A jumper is a metal bridge that is used to close an electrical circuit. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To CLOSE/SHORT a jumper means connecting the pins of the jumper with the plastic clip and to OPEN a jumper means removing the plastic clip from a jumper.



Jumper

Before the NOVA-LX is installed in the system, the jumpers must be set in accordance with the desired configuration. The jumpers on the NOVA-LX are listed in **Table 5-1**.

Description	Label	Type
AT or ATX power select	JP7	3-pin header
CF card setup	JP1	3-pin header
Clear CMOS	JP8	3-pin header
COM 1/2 Pin 9 setting	JP16	10-pin header
COM 3 function select	JP12	6-pin header
COM 4 function select	JP13	6-pin header
LCD clock setting	JP5	3-pin header
LCD voltage selection	JP6	3-pin header
PCI-104 Voltage Setup	JP2	3-pin header
PC/104-Plus SERIRQ Select	JP9	3-pin header

Table 5-1: Jumpers

5.5.1 AT Power Select Jumper Settings

Jumper Label: **JP1**

Jumper Type: 2-pin header

Jumper Settings: See **Table 5-2**

Jumper Location: See Figure 5-2

The AT Power Select jumper specifies the systems power mode as AT or ATX. AT Power Select jumper settings are shown in **Table 5-2**.

AT Power Select	Description	
Short	Use AT power	Default
Open	Use ATX power	

Table 5-2: AT Power Select Jumper Settings

The location of the AT or ATX Power Select jumper is shown in Figure 5-2 below.

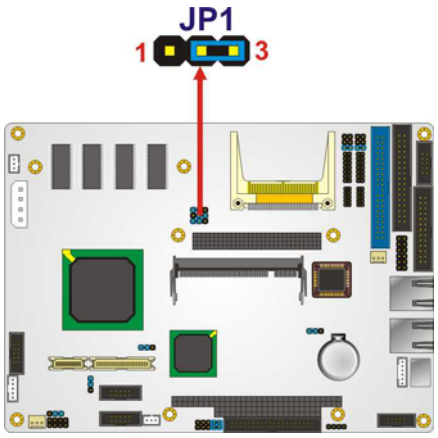


Figure 5-2: AT Power Select Jumper Location

5.5.2 AT or ATX Power Select Jumper Settings

Jumper Label:	**JP7**
Jumper Type:	23-pin header
Jumper Settings:	See **Table 5-2**
Jumper Location:	See Figure 5-2

The AT or ATX Power Select jumper specifies the systems power mode as AT or ATX. AT Power Select jumper settings are shown in **Table 5-2**.

AT Power Select	Description	
Short 1 – 2	Use AT power	Default
Short 2 - 3	Use ATX power	

Table 5-3: AT Power Select Jumper Settings

The location of the AT or ATX Power Select jumper is shown in Figure 5-2 below.

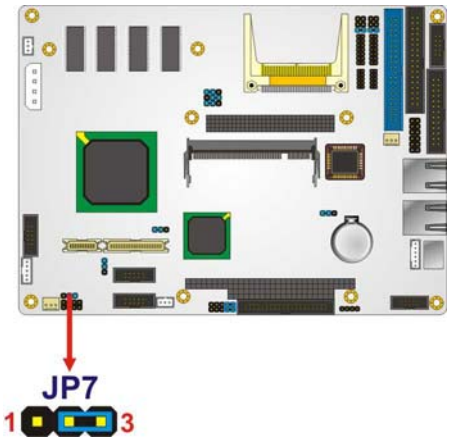


Figure 5-3: AT Power Select Jumper Location

5.5.3 CF Card Setup

Jumper Label: **JP1**

Jumper Type: 3-pin header

Jumper Settings: See **Table 5-4**

Jumper Location: See **Figure 5-4**

The CF Card Setup jumper sets the CF Type I card or CF Type II cards as either the slave device or the master device. CF Card Setup jumper settings are shown in **Table 5-4**.

CF Card Setup	Description	
Short 1-2	Master	
Short 2-3	Slave	Default

Table 5-4: CF Card Setup Jumper Settings

The CF Card Setup jumper location is shown in **Figure 5-4**.

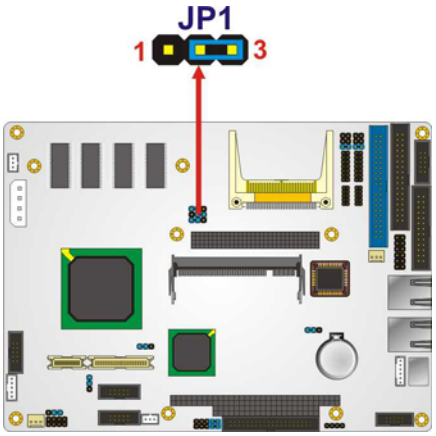


Figure 5-4: CF Card Setup Jumper Location

5.5.4 Clear CMOS Jumper

Jumper Label:	JP8
Jumper Type:	3-pin header
Jumper Settings:	See Table 5-5
Jumper Location:	See Figure 5-5

If the NOVA-LX fails to boot due to improper BIOS settings, the clear CMOS jumper clears the CMOS data and resets the system BIOS information. To do this, use the jumper cap to close pins 1 and 2 for a few seconds then remove the jumper cap and enable pins 1 and 2 to remain open.

If the “CMOS Settings Wrong” message is displayed during the boot up process, the fault may be corrected by pressing the F1 to enter the CMOS Setup menu. Do one of the following:

- Enter the correct CMOS setting
- Load Optimal Defaults
- Load Failsafe Defaults.

After having done one of the above, save the changes and exit the CMOS Setup menu. The clear CMOS jumper settings are shown in **Table 5-5**.

Jumper Select	Description	
Short 1 - 2	Keep CMOS Setup	Default
Short 2 - 3	Clear CMOS Setup	

Table 5-5: Clear CMOS Jumper Settings

The location of the clear CMOS jumper is shown in **Figure 5-5** below.

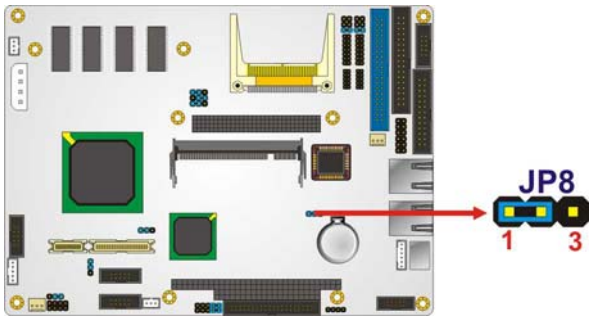


Figure 5-5: Clear CMOS Jumper

5.5.5 COM 1/2 Pin 9 Setting Jumper

Jumper Label: **JP16**

Jumper Type: 10-pin header

Jumper Settings: See Table 5-8

Jumper Location: See Figure 5-8

The COM 1/2 Pin 9 Setting jumper configures pin 9 on COM 1 and COM 2 as either a +5V, +12V power source or as a ring-in (RI) line. The COM 1/2 Pin 9 Setting jumper selection options are shown in Table 5-8.

COM 1/2 RI Pin	Description	
Short 1 – 3	COM 1 RI Pin use +12V	Default
Short 3 – 5	COM 1 RI Pin use +5V	
Short 7 – 9	COM 1 RI Pin use RI	
Short 2 – 4	COM 2 RI Pin use +12V	

Short 4 – 6	COM 2 RI Pin use +5V	
Short 8 – 10	COM 2 RI Pin use RI	

Table 5-6: COM 1/2 Pin 9 Setting Jumper Settings

The COM 1/2 Pin 9 Setting jumper location is shown in Figure 5-8 below.

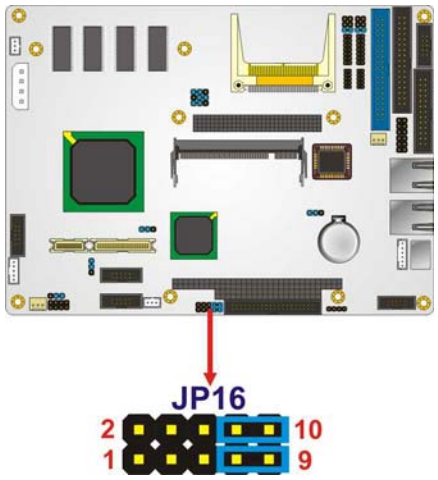


Figure 5-6: COM 1/2 Pin 9 Setting Jumper Location

5.5.6 COM 3/4 Function Select Jumper

Jumper Label: **JP12 and JP13**

Jumper Type: 6-pin header

Jumper Settings: See **Table 5-7**

Jumper Location: See **Figure 5-7**

The COM 3/4 Function Select jumper sets the communication protocol used by the second serial communications port (COM 3/4) as RS-232, RS-422 or RS-485. The COM 2 Function Select settings are shown in **Table 5-7**.

COM 2 Function Select	Description	
Short 1-2	RS-232	Default
Short 3-4	RS-422	

Short 5-6	RS-485	

Table 5-7: COM 3/4 Function Select Jumper Settings

The COM 3/4 Function Select jumper location is shown in **Figure 5-7**.

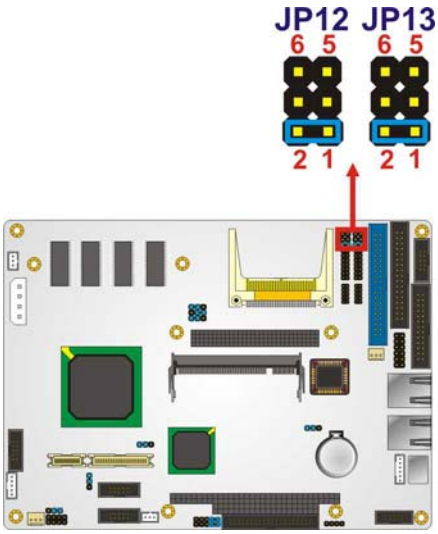


Figure 5-7: COM 2 Function Select Jumper Location

5.5.7 LCD Clock Select Jumper

Jumper Label: **JP5**

Jumper Type: 3-pin header

Jumper Settings: See **Table 5-1**

Jumper Location: See **Figure 5-8**

The LCD Clock Select jumper enables the LCD clock to be inverted. The LCD Clock Select settings are shown in **Table 5-1**.

LCD Clock Select	Description	
Short 1-2	Normal LCD Clock	Default
Short 2-3	Inverted LCD Clock	

Table 5-8: LCD Clock Select Jumper Settings

The LCD Clock Select jumper location is shown in **Figure 5-8**.

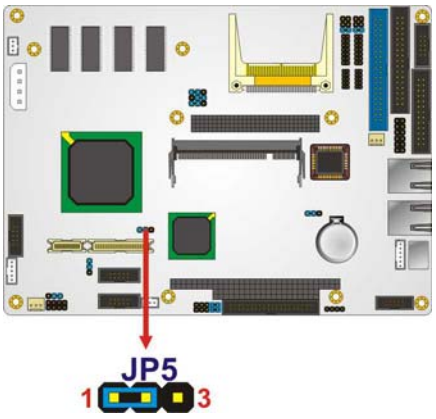


Figure 5-8: LCD Clock Select Jumper Location

5.5.8 LCD Voltage Selection

WARNING:

Permanent damage to the screen and NOVA-LX may occur if the wrong voltage is selected with this jumper. Please refer to the user guide that came with the monitor to select the correct voltage.

Jumper Label:	**JP6**
Jumper Type:	3-pin header
Jumper Settings:	See **Table 5-9**
Jumper Location:	See **Figure 5-9**

The **LCD Voltage Selection** jumper allows the LCD screen voltage to be set. The **LCD Voltage Selection** jumper settings are shown in **Table 5-9**.

LCD Voltage Select	Description	
Short 1-2	+3.3V LVDS	Default
Short 2-3	+5V LVDS	

Table 5-9: LCD Voltage Selection Jumper Settings

The LCD Voltage Selection jumper location. is shown in **Figure 5-9**.

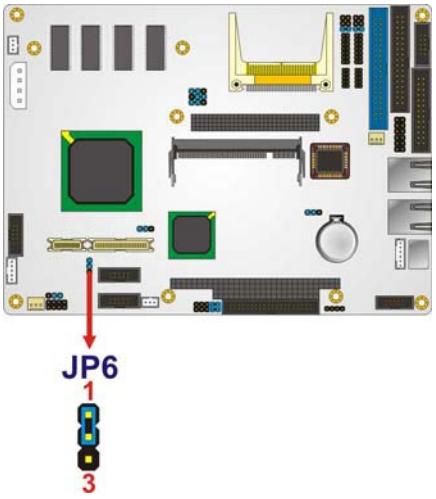


Figure 5-9: LCD Voltage Selection Jumper Location

5.5.9 PCI-104 Serial IRQ Selector

Jumper Label: **JP9**

Jumper Type: 2-pin header

Jumper Settings: See Table 5-10

Jumper Location: See Figure 5-11

The **PCI-104 Serial IRQ Selector** enables the serial IRQ protocol for this device. The **PCI-104 Serial IRQ Selector jumper** settings are shown in Table 5-10.

PCI-104 Serial IRQ Selector	Description	
Open	Disconnect	Default
Closed	Connect	

Table 5-10: PCI-104 Serial IRQ Selector Jumper Settings

The PCI-104 Voltage Setup jumper location is shown in Figure 5-11.

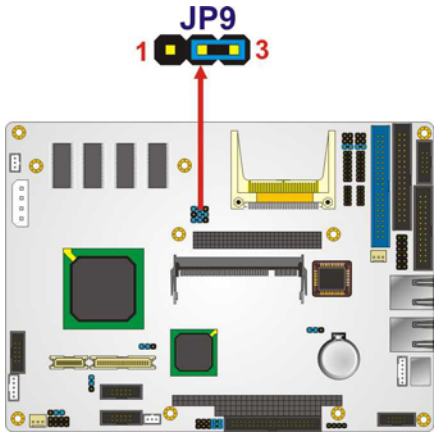


Figure 5-10: PCI-104 Serial IRQ Selector Jumper Pinout Locations

5.5.10 PCI-104 Voltage Setup

Jumper Label: **JP2**

Jumper Type: 3-pin header

Jumper Settings: See Table 5-11

Jumper Location: See Figure 5-11

The **PCI-104 Voltage Setup** jumper allows the LVDS screen voltage to be set. The **PCI-104 Voltage Setup** jumper settings are shown in Table 5-11.

PCI-104 Voltage Setup	Description	
Short 1-2	+5V	
Short 2-3	+3.3V	Default

Table 5-11: PCI-104 Voltage Setup Jumper Settings

The PCI-104 Voltage Setup jumper location. is shown in Figure 5-11.

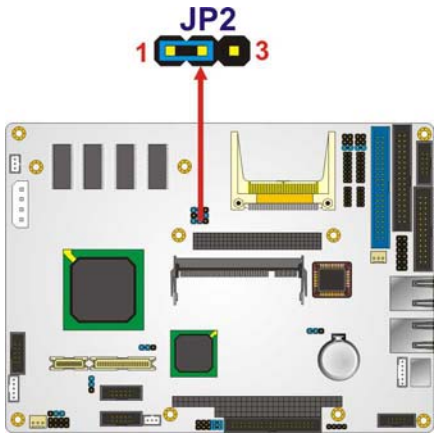


Figure 5-11: PCI-104 Voltage Setup Jumper Pinout Locations

5.6 Chassis Installation

5.6.1 Airflow

WARNING:

Airflow is critical to the cooling of the CPU and other onboard components. The chassis in which the NOVA-LX must have air vents to allow cool air to move into the system and hot air to move out.

The NOVA-LX must be installed in a chassis with ventilation holes on the sides allowing airflow to travel through the heat sink surface. In a system with an individual power supply unit, the cooling fan of a power supply can also help generate airflow through the board surface.

NOTE:

IEI has a wide range of backplanes available. Please contact your NOVA-LX vendor, reseller or an IEI sales representative at sales@iei.com.tw or visit the IEI website (http://www.ieiworld.com.tw) to find out more about the available chassis.

5.7 Internal Peripheral Device Connections

5.7.1 Peripheral Device Cables

The cables listed in **Table 5-12** are shipped with the NOVA-LX.

Quantity	Type
1	IDE Flat cable
1	VGA cable
1	Keyboard and mouse Y-cable
1	Audio cable
1	Quad RS-232 cable
2	USB cables
2	Single RS-232 cables

Table 5-12: IEI Provided Cables

Separately purchased optional IEI items that can be installed are listed below:

- FDD cable
- LPT cable
- RS-232/422/485 cable
- Quad COM port adapter

For more details about the items listed above, please refer to **Chapter 3**. Installation of the accessories listed above are described in detail below.

5.7.2 ATA Flat Cable Connection

The ATA 66/100 flat cable connects to the NOVA-LX to one or two IDE devices. To connect an IDE HDD to the NOVA-LX please follow the instructions below.

Step 1: **Locate the IDE connector**. The location/s of the IDE device connector/s is/are shown in **Chapter 3**.

Step 2: **Insert the connector**. Connect the IDE cable connector to the on-board connector. See Figure 5-12. A key on the front of the cable connector ensures it can only be inserted in one direction.

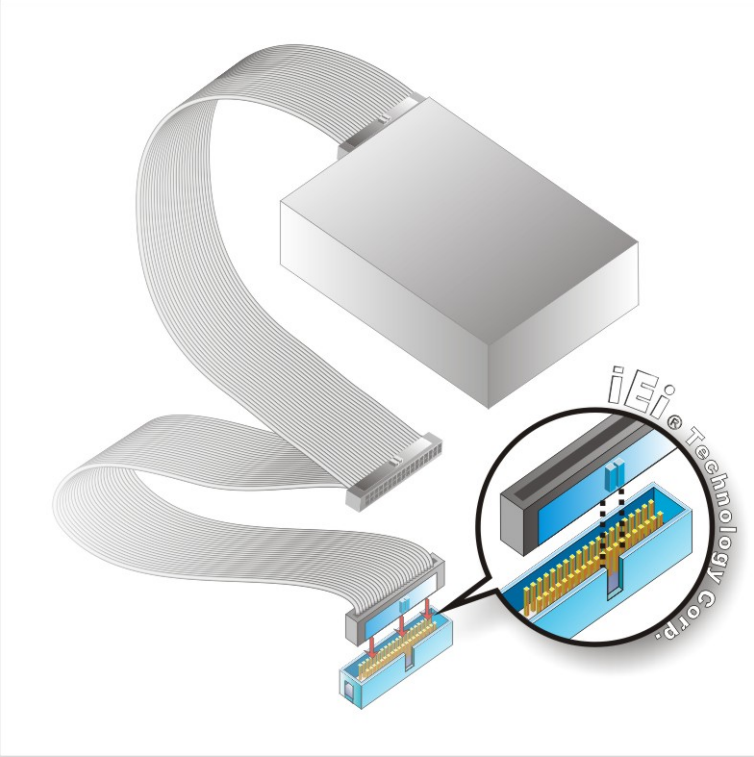


Figure 5-12: IDE Cable Connection

Step 3: **Connect the cable to an IDE device**. Connect the two connectors on the other side of the cable to one or two IDE devices. Make sure that pin 1 on the cable

corresponds to pin 1 on the connector.

5.7.3 Audio Kit Installation

The Audio Kit that came with the NOVA-LX connects to the 10-pin audio connector on the NOVA-LX. The audio kit consists of three audio jacks. One audio jack, Mic In, connects to a microphone. The remaining two audio jacks, Line-In and Line-Out, connect to two speakers. To install the audio kit, please refer to the steps below:

Step 1: **Locate the audio connector**. The location of the 10-pin audio connector is shown in **Chapter 3**.

Step 2: **Align pin 1**. Align pin 1 on the on-board connector with pin 1 on the audio kit connector. Pin 1 on the audio kit connector is indicated with a white dot. See **Figure 5-13**.

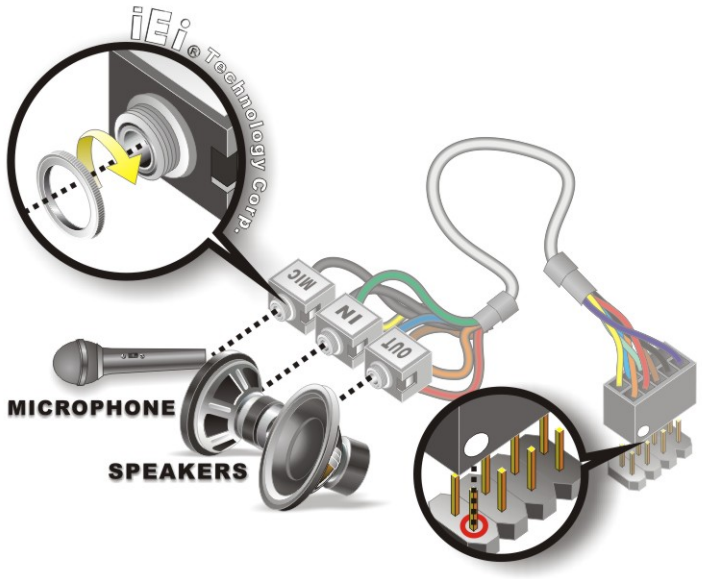


Figure 5-13: Audio Kit Cable Connection

Step 3: **Connect the audio devices**. Connect one speaker to the line-in audio jack, one speaker to the line-out audio jack and a microphone to the mic-in audio jack.

5.7.4 USB Cable (Dual Port without Bracket)

The NOVA-LX is shipped with a dual port USB 2.0 cable. To connect the USB cable connector, please follow the steps below.

Step 1: **Locate the connectors**. The locations of the USB connectors are shown in **Chapter 3**.

WARNING:

If the USB pins are not properly aligned, the USB device can burn out.

Step 2: **Align the connectors**. The cable has two connectors. Correctly align pin 1on each cable connector with pin 1 on the NOVA-LX USB connector.

Step 3: **Insert the cable connectors**. Once the cable connectors are properly aligned with the USB connectors on the NOVA-LX, connect the cable connectors to the on-board connectors. See **Figure 5-14**.

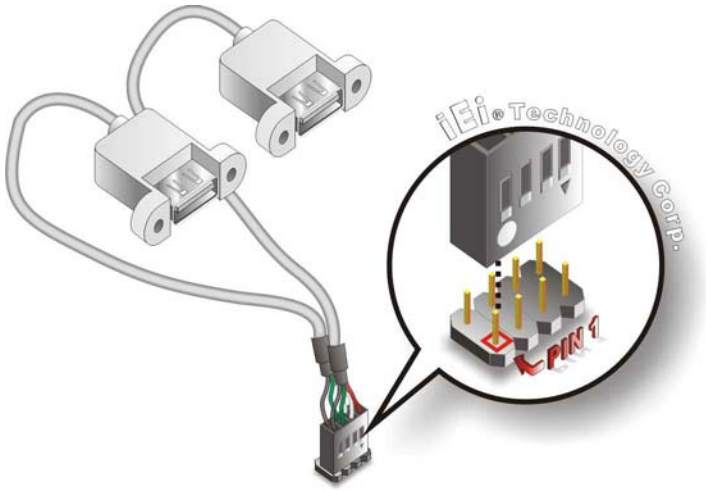


Figure 5-14: Dual USB Cable Connection

Step 4: **Attach the USB connectors to the chassis**. The USB 2.0 connectors each of two retention screw holes. To secure the connectors to the chassis please refer

to the installation instructions that came with the chassis.

5.7.5 FDD Cable Connection

The FDD flat cable connects to the NOVA-LX to one FDD device. To connect an FDD to the NOVA-LX please follow the instructions below.

Step 1: **Locate the FDD connector**. The location of the FDD device connector is shown in **Chapter 3**.

Step 2: **Insert the connector**. Connect the FDD cable connector to the on-board connector. See **Figure 5-15**. A key on the front of the cable connector ensures it can only be inserted in one direction.

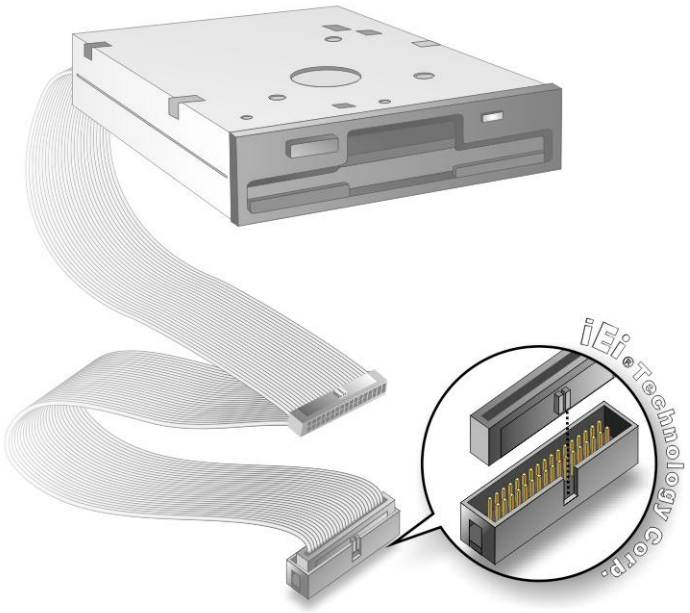


Figure 5-15: FDD Cable Connection

Step 3: **Connect the cable to an FDD device**. Connect the connector at the other end of the cable to an FDD device. Make sure that pin 1 on the cable corresponds to pin 1 on the connector.

5.7.6 Parallel Port Cable with Slot Bracket

The optional parallel port (LPT) cable respectively connects the on-board LPT 26-pin box header to an external LPT device (like a printer). The cable comprises a 26-pin female header, to be connected to the on-board LPT box-header, on one side and on the other side a standard external LPT connector. To connect the LPT cable, please follow the steps below.

Step 1: **Locate the connector**. The LPT connector location is shown in **Chapter 4**.

Step 2: **Align the connectors**. Correctly align pin 1 on the cable connector with pin 1 on the NOVA-LX LPT box-header connector. See **Figure 5-16**.

Step 3: **Insert the cable connectors** Once the cable connector is properly aligned with the 26-pin box-header connector on the NOVA-LX, connect the cable connector to the on-board connector. See **Figure 5-16.**

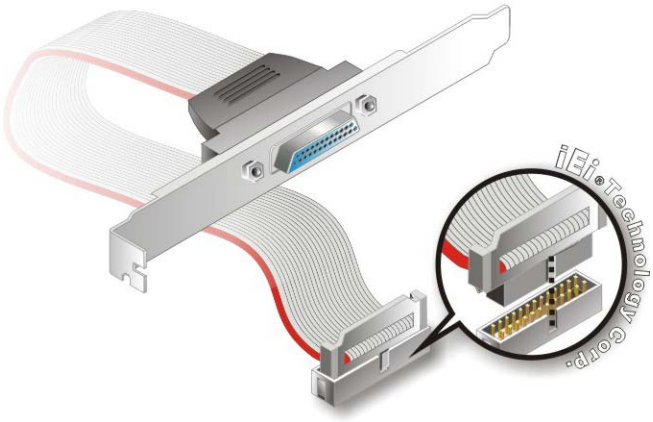


Figure 5-16: LPT Cable Connection

Step 4: **Attach the LPT connector bracket to the chassis**. The LPT cable connector is connected to a standard external LPT interface connector. To secure the LPT interface connector to the chassis please refer to the installation instructions that came with the chassis.

Step 5: **Connect LPT device**. Once the LPT interface connector is connected to the chassis, the LPT device can be connected to the LPT interface connector. See **Figure 5-17**

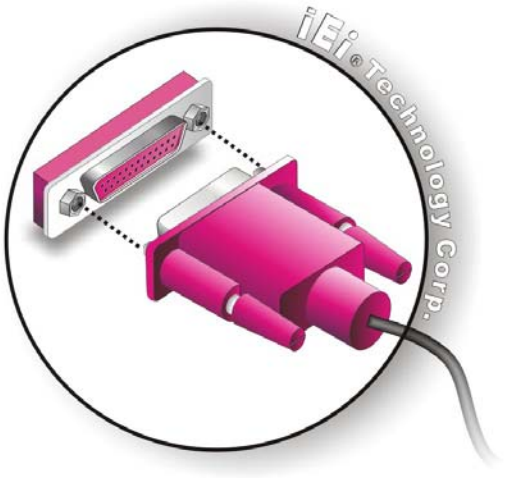


Figure 5-17: Connect the LPT Device

5.7.7 Dual RS-232 Cable with Slot Bracket

The dual RS-232 cable slot connector consists of two connectors attached to two independent cables. Each cable is then attached to a D-sub 9 male connector that is mounted onto a slot. To install the dual RS-232 cable, please follow the steps below.

Step 1: **Locate the connectors**. The locations of the RS-232 connectors are shown in **Chapter 3**.

Step 2: **Insert the cable connectors**. Insert one connector into each serial port box headers. See **Figure 5-18**. A key on the front of the cable connectors ensures the connector can only be installed in one direction.

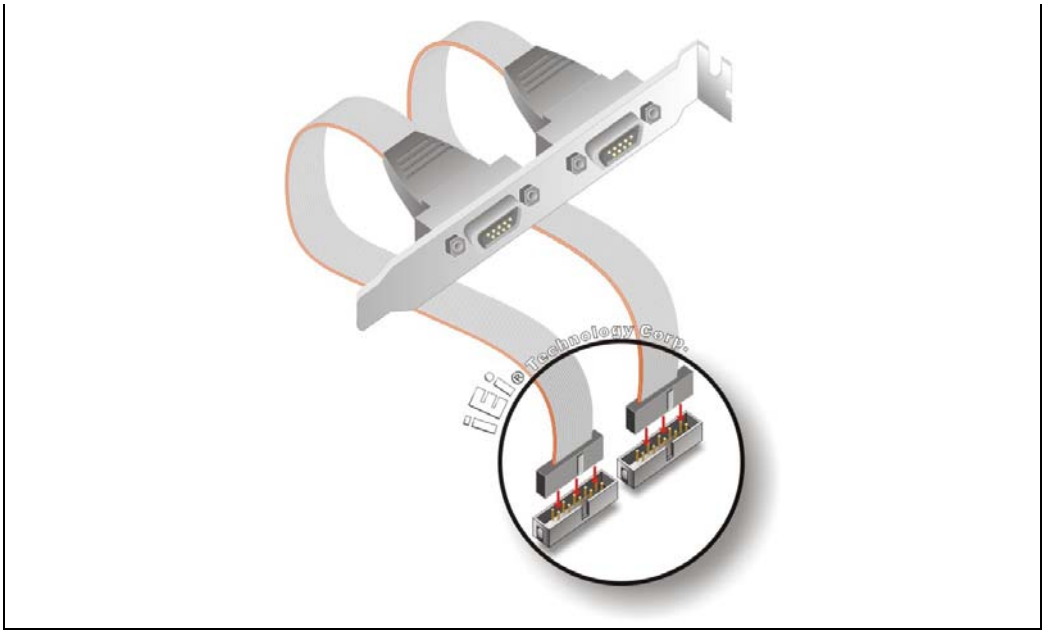


Figure 5-18: Dual RS-232 Cable Installation

Step 3: **Secure the bracket**. The dual RS-232 connector has two D-sub 9 male connectors secured on a bracket. To secure the bracket to the chassis please refer to the reference material that came with the chassis**Step 0:**

5.7.8 Single RS-232/422/485 Cable with Slot Bracket

The single RS-232/422/485 cable consists of one serial port connectors attached to a serial communications cable that is then attached to a D-sub 9 male connector that is mounted onto a bracket. To install the single RS-232/422/485 cable, please follow the steps below.

Step 1: **Locate the connector**. The location of the RS-232/422/485 connector is shown in **Chapter 3**.

Step 2: **Insert the cable connector**. Insert the connector into the serial port box header. See **Figure 5-19**. A key on the front of the cable connectors ensures the connector can only be installed in one direction.

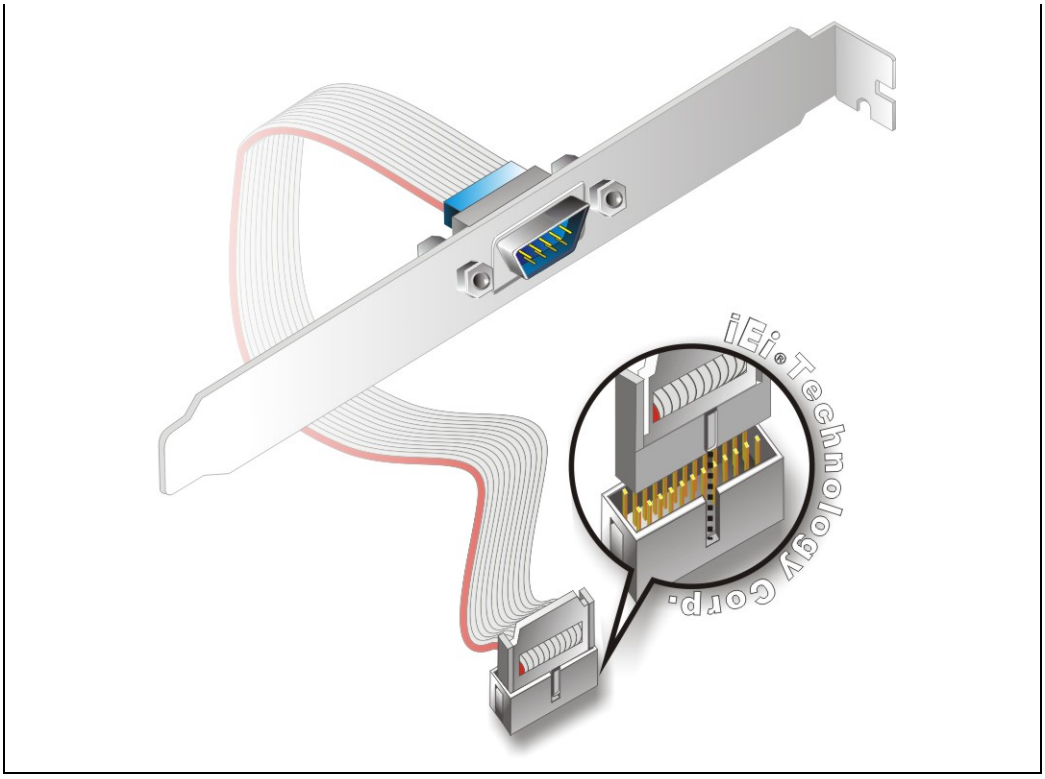


Figure 5-19: Single RS-232 Cable Installation

Step 3: **Secure the bracket**. The single RS-232 connector has one D-sub 9 male connector secured to a bracket. To secure the bracket to the chassis please refer to the reference material that came with the chassis

5.8 External Peripheral Interface Connection

The following external peripheral devices can be connected to the external peripheral interface connectors.

- RJ-45 Ethernet cable connectors
- PS/2 Y-cable

To install these devices, connect the corresponding cable connector from the actual device to the corresponding NOVA-LX external peripheral interface connector making sure the pins are properly aligned.

5.8.1 LAN Connection

There are two external RJ-45 LAN connectors for PCIe GbE connection. The RJ-45 connectors enable connection to an external network. To connect a LAN cable with an RJ-45 connector, please follow the instructions below.

Step 1: **Locate the RJ-45 connectors**. The locations of the USB connectors are shown in **Chapter 4**.

Step 2: **Align the connectors.** Align the RJ-45 connector on the LAN cable with one of the RJ-45 connectors on the NOVA-LX. See **Figure 5-20**.

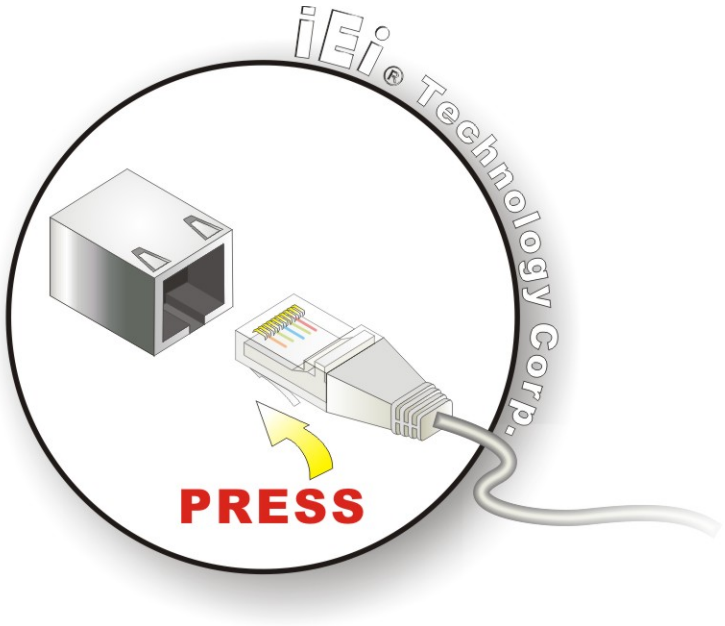


Figure 5-20: LAN Connection

Step 3: **Insert the LAN cable RJ-45 connector.** Once aligned, gently insert the LAN cable RJ-45 connector into the onboard RJ-45 connector.

5.8.2 PS/2 Y-Cable Connection

The NOVA-LX has a PS/2 connector on the external peripheral interface panel. The dual PS/2 connector is connected to the PS/2 Y-cable that came with the NOVA-LX. One of the PS/2 cables is connected to a keyboard and the other to a mouse to the system. Follow the steps below to connect a keyboard and mouse to the NOVA-LX.

Step 1: **Locate the dual PS/2 connector**. The location of the PS/2 connector is shown in **Chapter 3**.

Step 2: **Insert the keyboard/mouse connector**. Insert the PS/2 connector on the end of the PS/2 y-cable into the external PS/2 connector. See **Figure 5-21**.

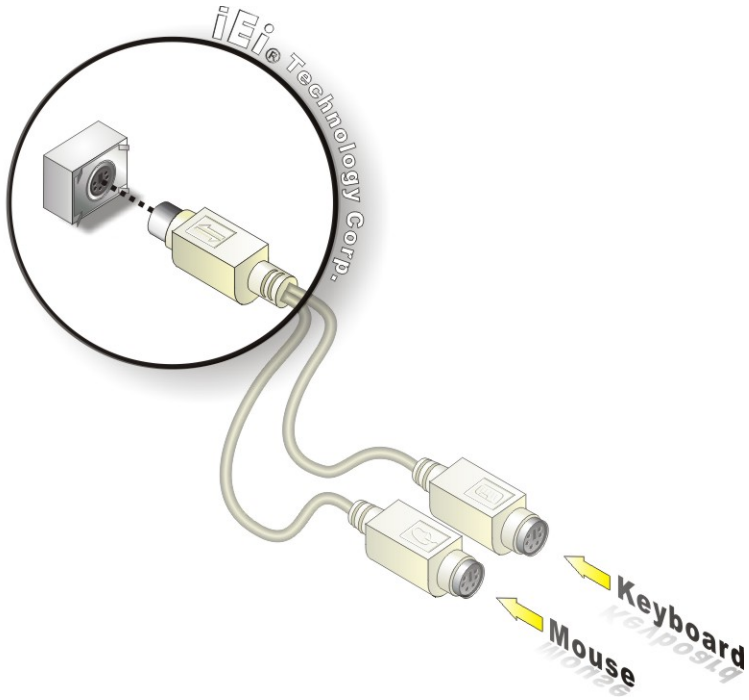


Figure 5-21: PS/2 Keyboard/Mouse Connector

Step 3: **Connect the keyboard and mouse**. Connect the keyboard and mouse to the appropriate connector. The keyboard and mouse connectors can be distinguished from each other by looking at the small graphic at the top of the connector.

Chapter

6

BIOS Screens

6.1 Introduction

A licensed copy of AMI BIOS is preprogrammed into the ROM BIOS. The BIOS setup program allows users to modify the basic system configuration. This chapter describes how to access the BIOS setup program and the configuration options that may be changed.

6.1.1 Starting Setup

The AMI BIOS is activated when the computer is turned on. The setup program can be activated in one of two ways.

1. Press the **DELETE** key as soon as the system is turned on or
2. Press the **DELETE** key when the “**Press Del to enter SETUP**” message appears on the screen. 0.

If the message disappears before the **DELETE** key is pressed, restart the computer and try again.

6.1.2 Using Setup

Use the arrow keys to highlight items, press **ENTER** to select, use the PageUp and PageDown keys to change entries, press **F1** for help and press **ESC** to quit. Navigation keys are shown in.

Key	Function
Up arrow	Move to previous item
Down arrow	Move to next item
Left arrow	Move to the item on the left hand side
Right arrow	Move to the item on the right hand side
Esc key	Main Menu – Quit and not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu
Page Up key	Increase the numeric value or make changes
Page Dn key	Decrease the numeric value or make changes

F1 key	General help, only for Status Page Setup Menu and Option Page Setup Menu
F2 /F3 key	Change color from total 16 colors. F2 to select color forward.
F10 key	Save all the CMOS changes, only for Main Menu

Table 6-1: BIOS Navigation Keys

6.1.3 Getting Help

When **F1** is pressed a small help window describing the appropriate keys to use and the possible selections for the highlighted item appears. To exit the Help Window press **Esc** or the **F1** key again.

6.1.4 Unable to Reboot After Configuration Changes

If the computer cannot boot after changes to the system configuration is made, CMOS defaults. Use the jumper described in Chapter **Chapter 5**.

6.1.5 BIOS Menu Bar

The **menu bar** on top of the BIOS screen has the following main items:

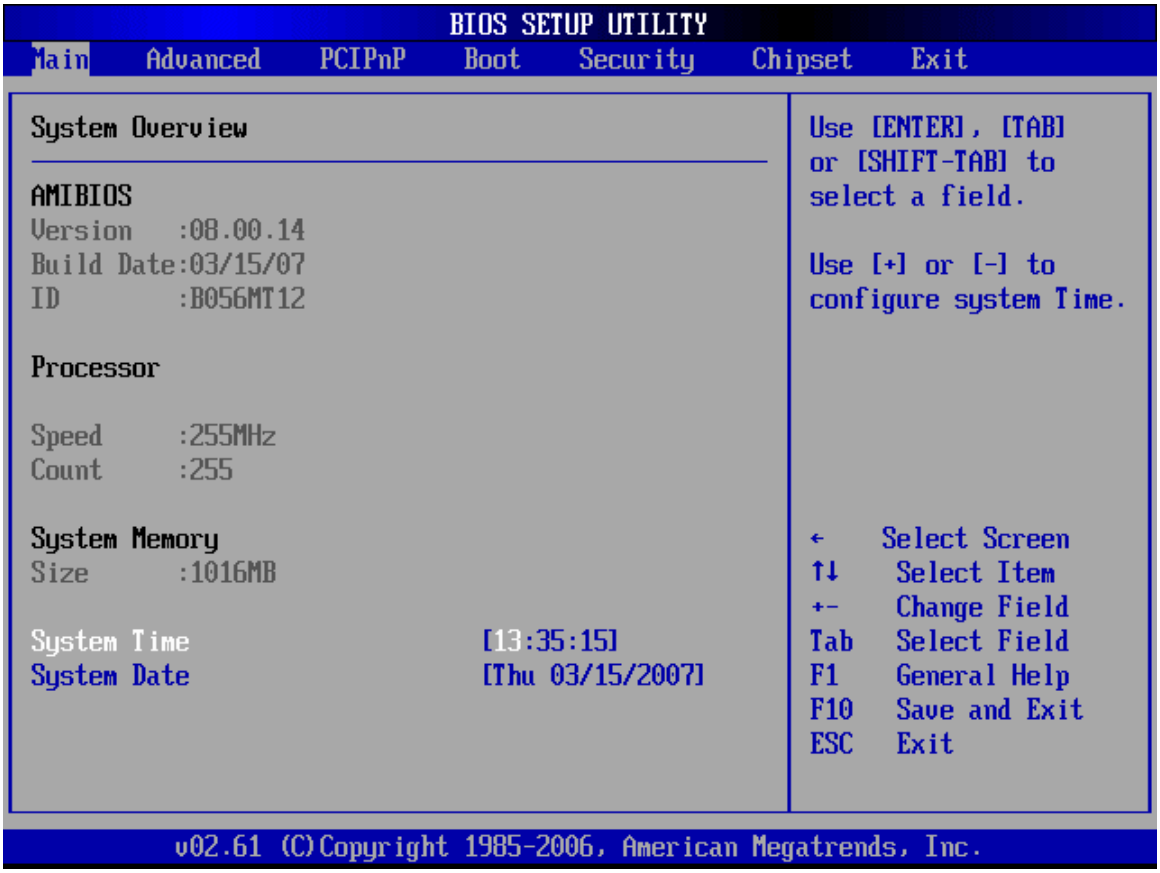
- **Main** Changes the basic system configuration.
- **Advanced** Changes the advanced system settings.
- **PCIPnP** Changes the advanced PCI/PnP Settings
- **Boot** Changes the system boot configuration.
- **Security** Sets User and Supervisor Passwords.
- **Chipset** Changes the chipset settings.
- **Power** Changes power management settings.
- **Exit** Selects exit options and loads default settings

The following sections completely describe the configuration options found in the menu items at the top of the BIOS screen and listed above.

6.2 Main

The **Main** BIOS menu (**BIOS Menu 1**) appears when the **BIOS Setup** program is entered.

The **Main** menu gives an overview of the basic system information.



BIOS Menu 1: Main

➔ System Overview

The **System Overview** lists a brief summary of different system components. The fields in **System Overview** cannot be changed. The items shown in the system overview include:

- **AMI BIOS**: Displays auto-detected BIOS information
  - **Version**: Current BIOS version
  - **Build Date**: Date the current BIOS version was made
  - **ID**: Installed BIOS ID

- **Processor**: Displays auto-detected CPU specifications
  - **Type**: Names the currently installed processor
  - **Speed**: Lists the processor speed
  - **Count**: The number of CPUs on the motherboard
- **System Memory**: Displays the auto-detected system memory.
  - **Size**: Lists memory size

The System Overview field also has two user configurable fields:

➔ **System Time [xx:xx:xx]**

Use the **System Time** option to set the system time. Manually enter the hours, minutes and seconds.

➔ **System Date [xx/xx/xx]**

Use the **System Date** option to set the system date. Manually enter the day, month and year.

6.3 Advanced

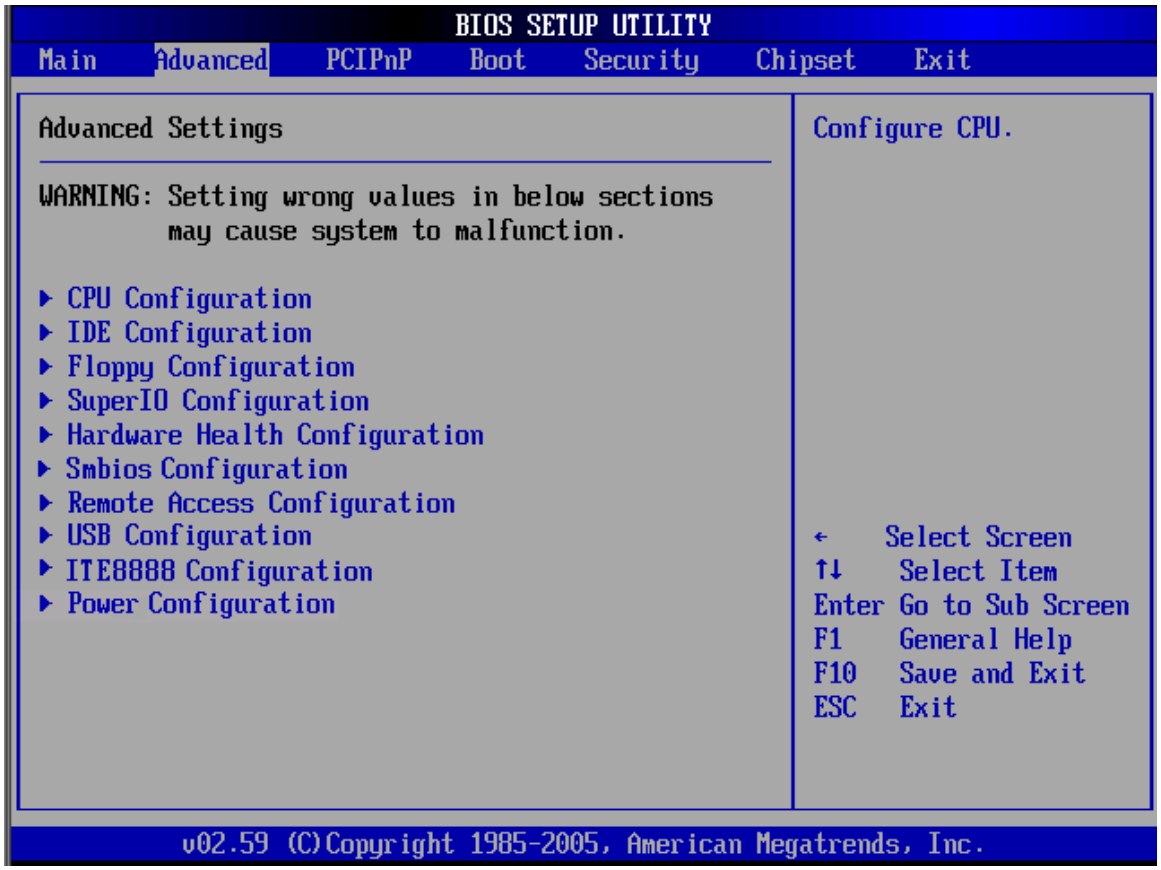
Use the **Advanced** menu (**BIOS Menu 2**) to configure the CPU and peripheral devices through the following sub-menus:

WARNING:

Setting the wrong values in the sections below may cause the system to malfunction. Make sure that the settings made are compatible with the hardware.

- **CPU Configuration** (see Section 6.3.1)
- **IDE Configuration** (see Section 6.3.2)
- Floppy Configuration (see Section)
- **SuperIO Configuration** (see Section 6.3.3)
- **Hardware Health Configuration** (see Section 6.3.5)

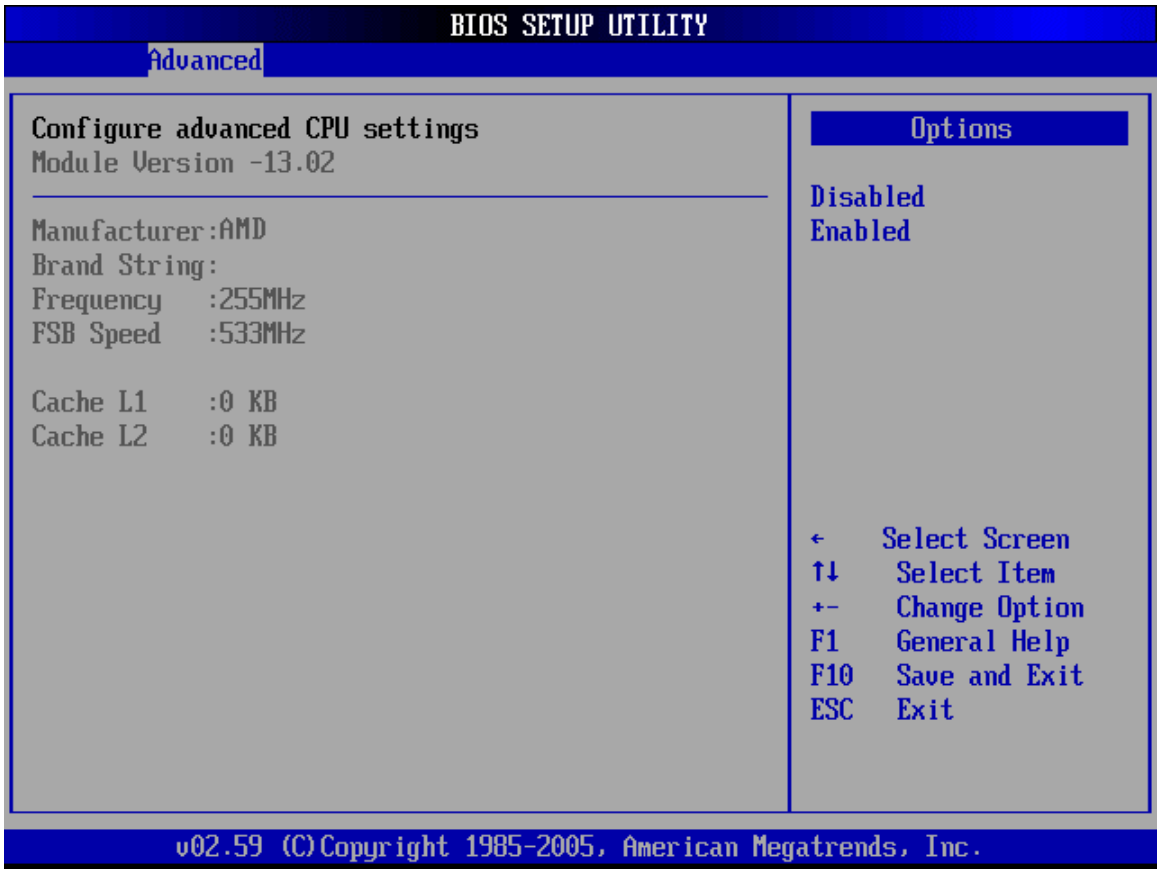
- **Smbios Configuration** (see Section 6.3.6)
- **Remote Access Configuration** (see Section 6.3.7)
- **USB Configuration** (see Section 6.3.7)
- IT888 Configuration (see Section)
- Power Configuration (See Section)



BIOS Menu 2: Advanced

6.3.1 CPU Configuration

Use the **CPU Configuration** menu (BIOS Menu 3) to view detailed CPU specifications and configure the CPU.



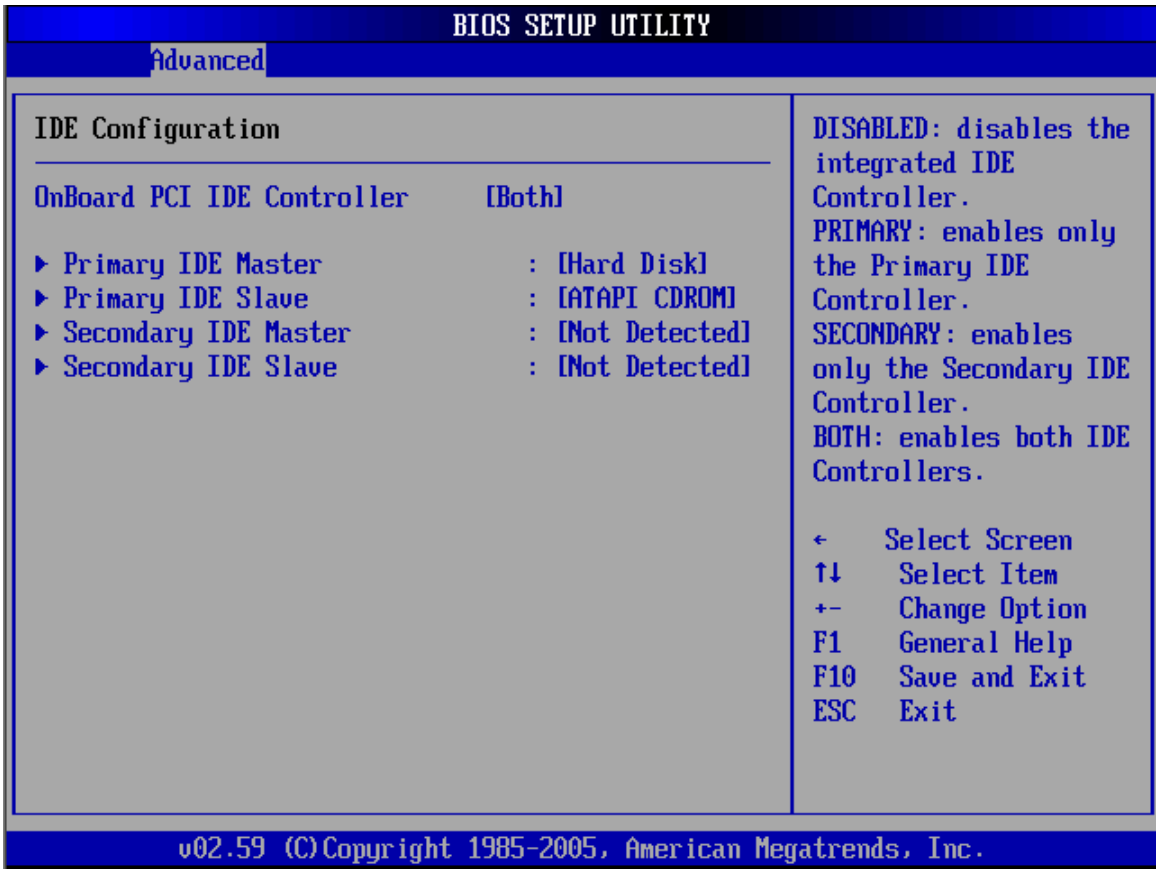
BIOS Menu 3: CPU Configuration

The CPU Configuration menu (BIOS Menu 3) lists the following CPU details:

- **Manufacturer**: Lists the name of the CPU manufacturer
- **Frequency:** Lists the CPU processing speed
- **FSB Speed**: Lists the FSB speed
- **Cache L1**: Lists the CPU L1 cache size
- **Cache L2**: Lists the CPU L2 cache size
- Ratio Actual Value:

6.3.2 IDE Configuration

Use the **IDE Configuration** menu (**BIOS Menu 4**) to change and/or set the configuration of the IDE devices installed in the system.


BIOS SETUP UTILITY
Advanced
IDE Configuration
OnBoard PCI IDE Controller [Both]
Primary IDE Master : [Hard Disk]
Primary IDE Slave : [ATAPI CDROM]
Secondary IDE Master : [Not Detected]
Secondary IDE Slave : [Not Detected]
DISABLED: disables the integrated IDE Controller.
PRIMARY: enables only the Primary IDE Controller.
SECONDARY: enables only the Secondary IDE Controller.
BOTH: enables both IDE Controllers.
← Select Screen
↑↓ Select Item
+- Change Option
F1 General Help
F10 Save and Exit
ESC Exit
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BIOS Menu 4: IDE Configuration

➔ **OnBoard PCI IDE Controller [Both]**

Use the **OnBoard PCI IDE Controller** BIOS option to specify the IDE channels used by the onboard PCI IDE controller. The following configuration options are available.

➔ **Disabled** Prevents the system from using the onboard IDE controller

➔ **Primary** Only allows the system to detect the Primary IDE channel, including both the Primary Master and the Primary Slave

➔ **Secondary** Only allows the system to detect the Secondary IDE channel, including both the Secondary Master and

Secondary Slave

➔ **Both** **DEFAULT** Allows the system to detect both the Primary and Secondary IDE channels including the Primary Master, Primary Slave, Secondary Master and Secondary Slave.

➔ **IDE Master and IDE Slave**

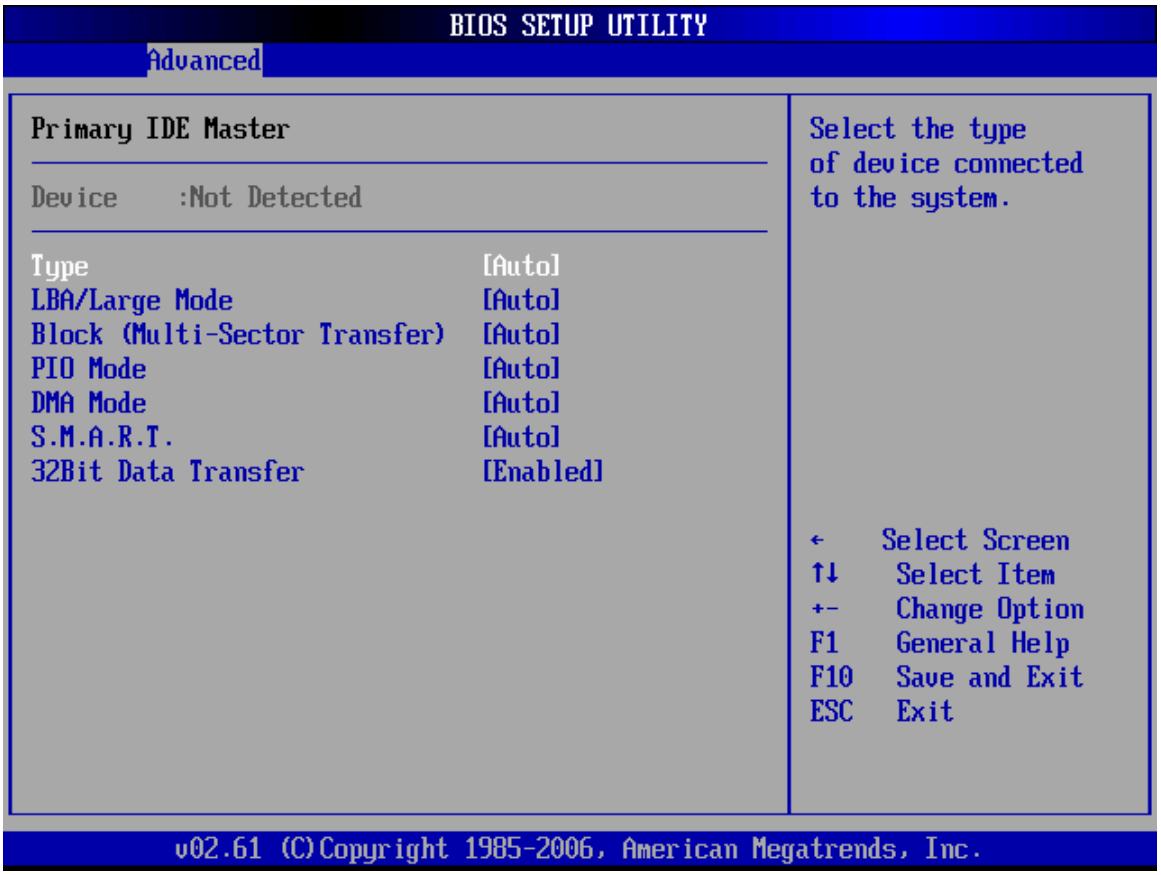
When entering setup, BIOS auto detects the presence of IDE devices. This displays the status of the auto detected IDE devices. The following IDE devices are detected and are shown in the **IDE Configuration** menu:

- Primary IDE Master
- Primary IDE Slave
- Secondary IDE Master
- Secondary IDE Slave

The **IDE Configuration** menu (**BIOS** Menu 4) allows changes to the configurations for the IDE devices installed in the system. If an IDE device is detected, and one of the above listed four BIOS configuration options are selected, the IDE configuration options shown in **Section 6.3.2.1** appear.

6.3.2.1 IDE Master, IDE Slave

Use the **IDE Master** and **IDE Slave** configuration menu to view both primary and secondary IDE device details and configure the IDE devices connected to the system.



BIOS Menu 5: IDE Master and IDE Slave Configuration

➔ **Auto-Detected Drive Parameters**

The “grayed-out” items in the left frame are IDE disk drive parameters automatically detected from the firmware of the selected IDE disk drive. The drive parameters are listed as follows:

- **Device**: Lists the device type (e.g. hard disk, CD-ROM etc.)
- **Type**: Indicates the type of devices a user can manually select
- **Vendor**: Lists the device manufacturer
- **Size**: List the storage capacity of the device.
- **LBA Mode**: Indicates whether the LBA (Logical Block Addressing) is a method of addressing data on a disk drive is supported or not.
- **Block Mode**: Block mode boosts IDE drive performance by increasing the amount of data transferred. Only 512 bytes of data can be transferred per

interrupt if block mode is not used. Block mode allows transfers of up to 64 KB per interrupt.

- **PIO Mode**: Indicates the PIO mode of the installed device.
- **Async DMA**: Indicates the highest Asynchronous DMA Mode that is supported.
- **Ultra DMA**: Indicates the highest Synchronous DMA Mode that is supported.
- **S.M.A.R.T.**: Indicates whether or not the Self-Monitoring Analysis and Reporting Technology protocol is supported.
- **32Bit Data Transfer**: Enables 32-bit data transfer.

➔ **Type [Auto]**

Use the **Type** BIOS option select the type of device the AMIBIOS attempts to boot from after the Power-On Self-Test (POST) is complete.

➔ **Not Installed** BIOS is prevented from searching for an IDE disk drive on the specified channel.

➔ **Auto** **DEFAULT** The BIOS auto detects the IDE disk drive type attached to the specified channel. This setting should be used if an IDE hard disk drive is attached to the specified channel.

➔ **CD/DVD** The CD/DVD option specifies that an IDE CD-ROM drive is attached to the specified IDE channel. The BIOS does not attempt to search for other types of IDE disk drives on the specified channel.

➔ **ARMD** This option specifies an ATAPI Removable Media Device. These include, but are not limited to:

- ➔ **ZIP**
- ➔ **LS-120**

➔ **LBA/Large Mode [Auto]**

Use the **LBA/Large Mode** option to disable or enable BIOS to auto detects LBA (Logical Block Addressing). LBA is a method of addressing data on a disk drive. In LBA mode, the maximum drive capacity is 137 GB.

➔ **Disabled**		BIOS is prevented from using the LBA mode control on the specified channel.
➔ **Auto**	**DEFAULT**	BIOS auto detects the LBA mode control on the specified channel.

➔ **Block (Multi Sector Transfer) [Auto]**

Use the **Block (Multi Sector Transfer)** to disable or enable BIOS to auto detect if the device supports multi-sector transfers.

➔ **Disabled**		BIOS is prevented from using Multi-Sector Transfer on the specified channel. The data to and from the device occurs one sector at a time.
➔ **Auto**	**DEFAULT**	BIOS auto detects Multi-Sector Transfer support on the drive on the specified channel. If supported the data transfer to and from the device occurs multiple sectors at a time.

➔ **PIO Mode [Auto]**

Use the **PIO Mode** option to select the IDE PIO (Programmable I/O) mode program timing cycles between the IDE drive and the programmable IDE controller. As the PIO mode increases, the cycle time decreases.

➔ **Auto**	**DEFAULT**	BIOS auto detects the PIO mode. Use this value if the IDE disk drive support cannot be determined.

➔	**0**	PIO mode 0 selected with a maximum transfer rate of 3.3MBps
➔	**1**	PIO mode 1 selected with a maximum transfer rate of 5.2MBps
➔	**2**	PIO mode 2 selected with a maximum transfer rate of 8.3MBps
➔	**3**	PIO mode 3 selected with a maximum transfer rate of 11.1MBps
➔	**4**	PIO mode 4 selected with a maximum transfer rate of 16.6MBps (This setting generally works with all hard disk drives manufactured after 1999. For other disk drives, such as IDE CD-ROM drives, check the specifications of the drive.)

➔ **DMA Mode [Auto]**

Use the **DMA Mode** BIOS selection to adjust the DMA mode options.

➔	**Auto**	**DEFAULT**	BIOS auto detects the DMA mode. Use this value if the IDE disk drive support cannot be determined.
➔	**SWDMA0**		Single Word DMA mode 0 selected with a maximum data transfer rate of 2.1MBps
➔	**SWDMA1**		Single Word DMA mode 1 selected with a maximum data transfer rate of 4.2MBps
➔	**SWDMA2**		Single Word DMA mode 2 selected with a maximum data transfer rate of 8.3MBps
➔	**MWDMA0**		Multi Word DMA mode 0 selected with a maximum data transfer rate of 4.2MBps
➔	**MWDMA1**		Multi Word DMA mode 1 selected with a maximum data transfer rate of 13.3MBps
➔	**MWDMA2**		Multi Word DMA mode 2 selected with a maximum data transfer rate of 16.6MBps

➔	**UDMA1**	Ultra DMA mode 0 selected with a maximum data transfer rate of 16.6MBps
➔	**UDMA1**	Ultra DMA mode 1 selected with a maximum data transfer rate of 25MBps
➔	**UDMA2**	Ultra DMA mode 2 selected with a maximum data transfer rate of 33.3MBps
➔	**UDMA3**	Ultra DMA mode 3 selected with a maximum data transfer rate of 44MBps (To use this mode, it is required that an 80-conductor ATA cable is used.)
➔	**UDMA4**	Ultra DMA mode 4 selected with a maximum data transfer rate of 66.6MBps (To use this mode, it is required that an 80-conductor ATA cable is used.)
➔	**UDMA5**	Ultra DMA mode 5 selected with a maximum data transfer rate of 99.9MBps (To use this mode, it is required that an 80-conductor ATA cable is used.)

➔ **S.M.A.R.T [Auto]**

Use the **S.M.A.R.T** option to auto-detect, disable or enable Self-Monitoring Analysis and Reporting Technology (SMART) on the drive on the specified channel. **S.M.A.R.T** predicts impending drive failures. The **S.M.A.R.T** BIOS option enables or disables this function.

➔	**Auto**	**DEFAULT**	BIOS auto detects HDD SMART support.
➔	**Disabled**		Prevents BIOS from using the HDD SMART feature.
➔	**Enabled**		Allows BIOS to use the HDD SMART feature

➔ **32Bit Data Transfer [Enabled]**

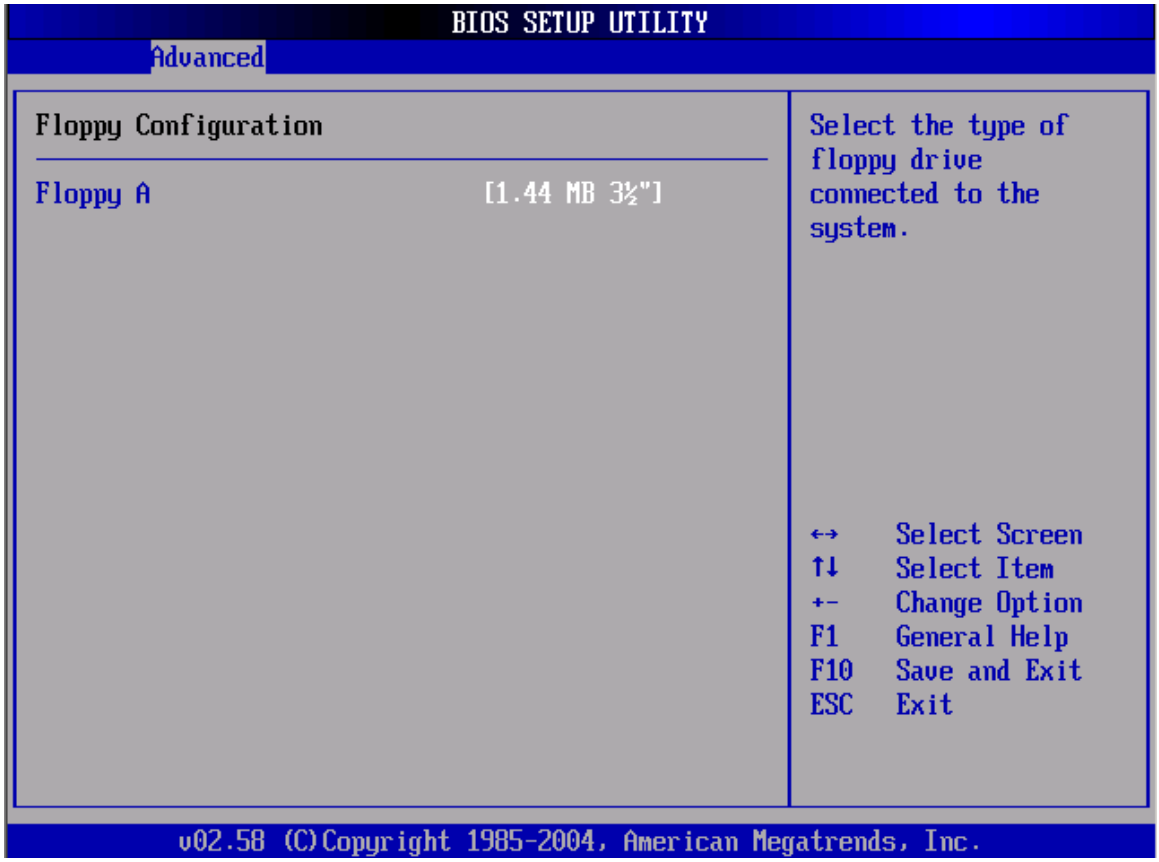
Use the **32Bit Data Transfer** BIOS option to enables or disable 32-bit data transfers.

➔ **Disabled** Prevents the BIOS from using 32-bit data transfers.

➔ **Enabled** **DEFAULT** Allows BIOS to use 32-bit data transfers on supported hard disk drives.

6.3.3 Floppy Configuration

Use the Floppy Configuration menu (**BIOS Menu 6**) to set or change the configurations for floppy disk drives.



BIOS Menu 6: Floppy Configuration

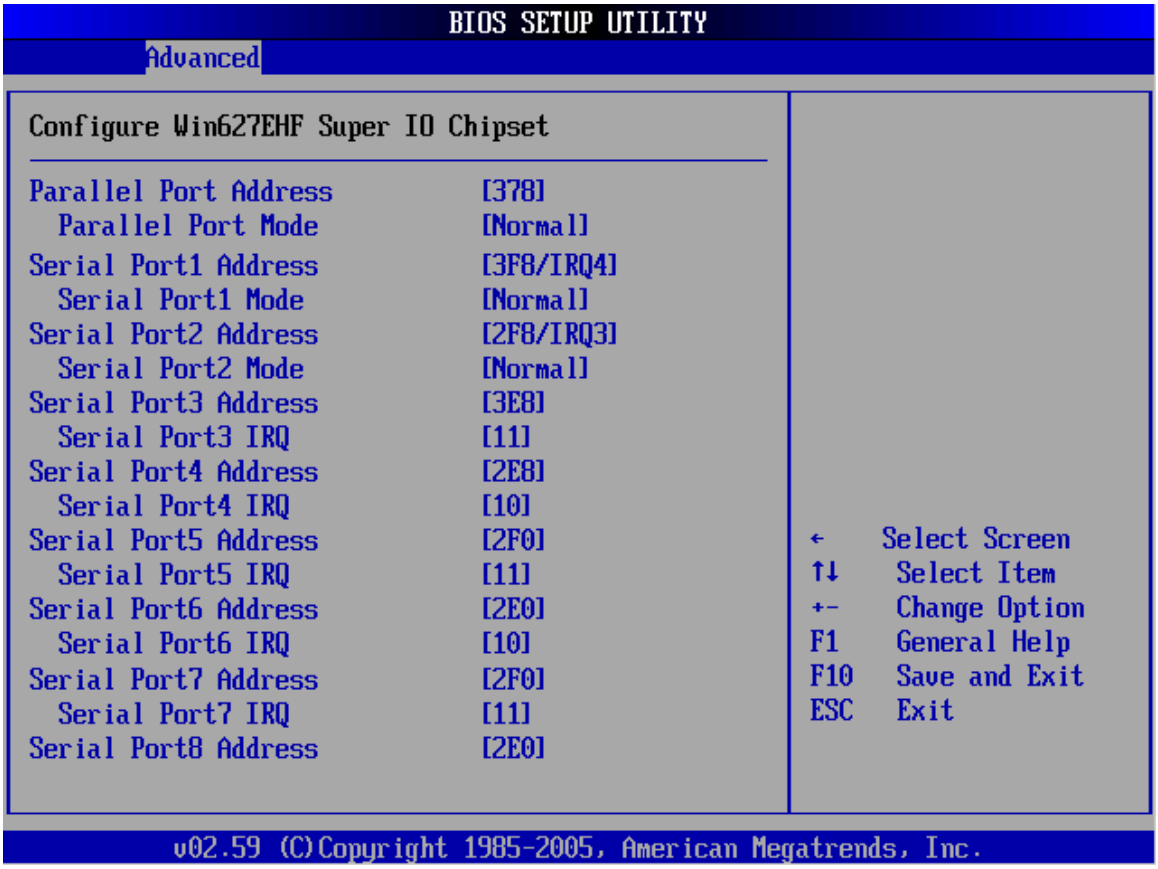
➔ **Floppy A [1.44 MB 3½”]**

The Floppy A configuration option determines the types of the floppy drive installed in the system. The following configuration options are available.

- Disabled (default)
- 360 KB 5¼”
- 1.2 MB 5¼”
- 720 KB 3 ½”
- 1.44 MB 3½”
- 2.88 MB 3½”

6.3.4 Super IO Configuration

Use the **Super IO Configuration** menu (**BIOS Menu 7**) to set or change the configurations for the FDD controllers, parallel ports and serial ports.



BIOS Menu 7: Super IO Configuration

➔ **Parallel Address [378]**

The **Parallel Port Address** BIOS option assigns the I/O port address of the parallel port. The following address options are available:

➔ **Disabled**		No I/O port address is assigned to the parallel port
➔ **378**	(Default)	Parallel Port I/O port address is 378
➔ **278**		Parallel Port I/O port address is 278
➔ **3BC**		Parallel Port I/O port address is 3BC

➔ **Parallel Port Mode [Normal]**

The Parallel Port Mode selection selects the mode the parallel port operates in.

➔ **Normal**	(DEFAULT)	The normal parallel port mode is the standard mode for parallel port operation.
EPP		The parallel port operates in the enhanced parallel port mode (EPP). The EPP mode supports bi-directional communication between the system and the parallel port device and the transmission rates between the two are much faster than the Normal mode.
➔ **ECP**		The parallel port operates in the extended capabilities port (ECP) mode. The ECP mode supports bi-directional communication between the system and the parallel port device and the transmission rates between the two are much faster than the SPP mode.
➔ **EPP + ECP**		The parallel port operates in the extended capabilities port (ECP) mode. The ECP mode

supports bi-directional communication between the system and the parallel port device and the transmission rates between the two are much faster than the Normal mode

The parallel port becomes compatible with EPP devices described above

➔ **Parallel Port IRQ [IRQ7]**

The **Parallel Port Address** BIOS option assigns the parallel port interrupt address. The following address options are available.

➔ **IRQ5**		Parallel port interrupt address is IRQ5
➔ **IRQ7**	(Default)	Parallel port interrupt address is IRQ7

➔ **Serial Port1 Address [3F8/IRQ4]**

Use the **Serial Port1 Address** option to select the Serial Port 1 base address.

➔ **Disabled**		No base address is assigned to Serial Port 1
➔ **3F8/IRQ4**	**DEFAULT**	Serial Port 1 I/O port address is 3F8 and the interrupt address is IRQ4
➔ **3E8/IRQ4**		Serial Port 1 I/O port address is 3E8 and the interrupt address is IRQ4
➔ **2E8/IRQ3**		Serial Port 1 I/O port address is 2E8 and the interrupt address is IRQ3

➔ **Serial Port2 Address [2F8/IRQ3]**

Use the **Serial Port2 Address** option to select the Serial Port 2 base address.

➔ **Disabled**		No base address is assigned to Serial Port 2
➔ **2F8/IRQ3**	**DEFAULT**	Serial Port 2 I/O port address is 3F8 and the interrupt address is IRQ3
➔ **3E8/IRQ4**		Serial Port 2 I/O port address is 3E8 and the interrupt address is IRQ4
➔ **2E8/IRQ3**		Serial Port 2 I/O port address is 2E8 and the interrupt address is IRQ3

➔ **Serial Port3 Address [3E8]**

Use the **Serial Port3 Address** option to select the base addresses for serial port 3

➔ **Disabled**		No base address is assigned to serial port 3
➔ **3E8**	**DEFAULT**	Serial port 3 I/O port address is 3E8
➔ **2E8**		Serial port 3 I/O port address is 2E8
➔ **2F0**		Serial port 3 I/O port address is 2F0
➔ **2E0**		Serial port 3 I/O port address is 2E0

➔ **Serial Port3 IRQ [10]**

Use the **Serial Port3 IRQ** option to select the interrupt address for serial port 3.

➔ **4**		Serial port 3 IRQ address is 4
➔ **9**		Serial port 3 IRQ address is 9
➔ **10**	**DEFAULT**	Serial port 3 IRQ address is 10
➔ **11**		Serial port 3 IRQ address is 11

➔ **Serial Port4 Address [2E8]**

Use the **Serial Port4 IRQ** option to select the interrupt address for serial port 4.

➔ **Disabled**		No base address is assigned to serial port 3
➔ **3E8**		Serial port 4 I/O port address is 3E8
➔ **2E8**	**DEFAULT**	Serial port 4 I/O port address is 2E8
➔ **2F0**		Serial port 4 I/O port address is 2F0
➔ **2E0**		Serial port 4 I/O port address is 2E0

➔ **Serial Port4 IRQ [10]**

Use the **Serial Port4 IRQ** option to select the interrupt address for serial port 4.

➔ **3**	**DEFAULT**	Serial port 4 IRQ address is 3
➔ **9**		Serial port 4 IRQ address is 9
➔ **10**	**DEFAULT**	Serial port 4 IRQ address is 10
➔ **11**		Serial port 4 IRQ address is 11

➔ **Serial Port5 Address [2E0]**

Use the **Serial Port5 IRQ** option to select the interrupt address for serial port 5.

➔ **Disabled**		No base address is assigned to serial port 5
➔ **3E8**		Serial port 6 I/O port address is 3E8
➔ **2E8**		Serial port 6 I/O port address is 2E8
➔ **2F0**	**DEFAULT**	Serial port 6I/O port address is 2F0
➔ **2E0**		Serial port 6 I/O port address is 2E8

➔ **Serial Port5 IRQ [11]**

Use the **Serial Port5 IRQ** option to select the interrupt address for serial port 5.

➔ **10**		Serial port 5 IRQ address is 10
➔ **11**	**DEFAULT**	Serial port 5 IRQ address is 11

➔ **Serial Port6 Address [2D8]**

Use the **Serial Port6 IRQ** option to select the interrupt address for serial port 6.

➔ **Disabled**		No base address is assigned to serial port 6
➔ **3E8**		Serial port 6 I/O port address is 3E8
➔ **2E8**		Serial port 6 I/O port address is 2E8
➔ **2F0**		Serial port 6I/O port address is 2F0
➔ **2E0**	**DEFAULT**	Serial port 6 I/O port address is 2E8

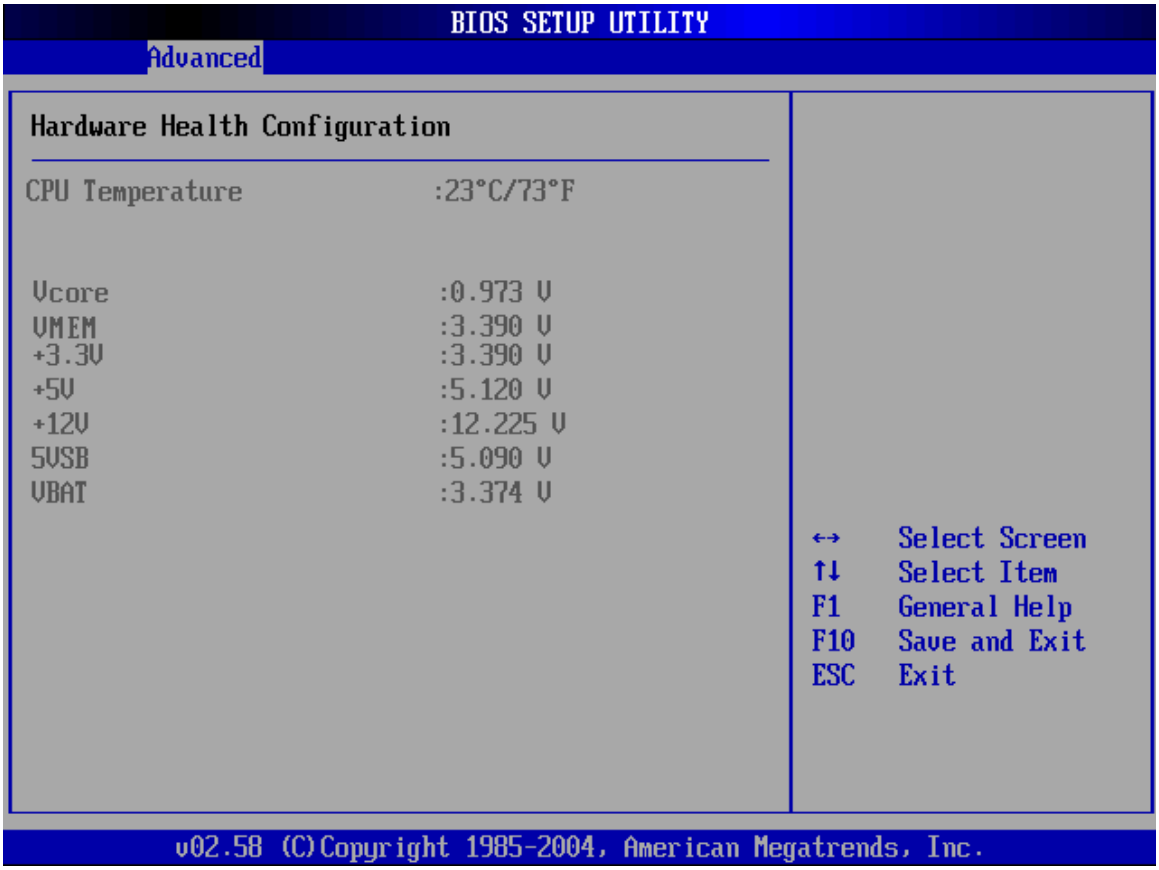
➔ **Serial Port6 IRQ [10]**

Use the **Serial Port6 IRQ** option to select the interrupt address for serial port 6.

➔ **10**	**DEFAULT**	Serial port 6 IRQ address is 10
➔ **11**		Serial port 6 IRQ address is 11

6.3.5 Hardware Health Configuration

The **Hardware Health Configuration** menu (**BIOS Menu 8**) shows the operating temperature, fan speeds and system voltages.



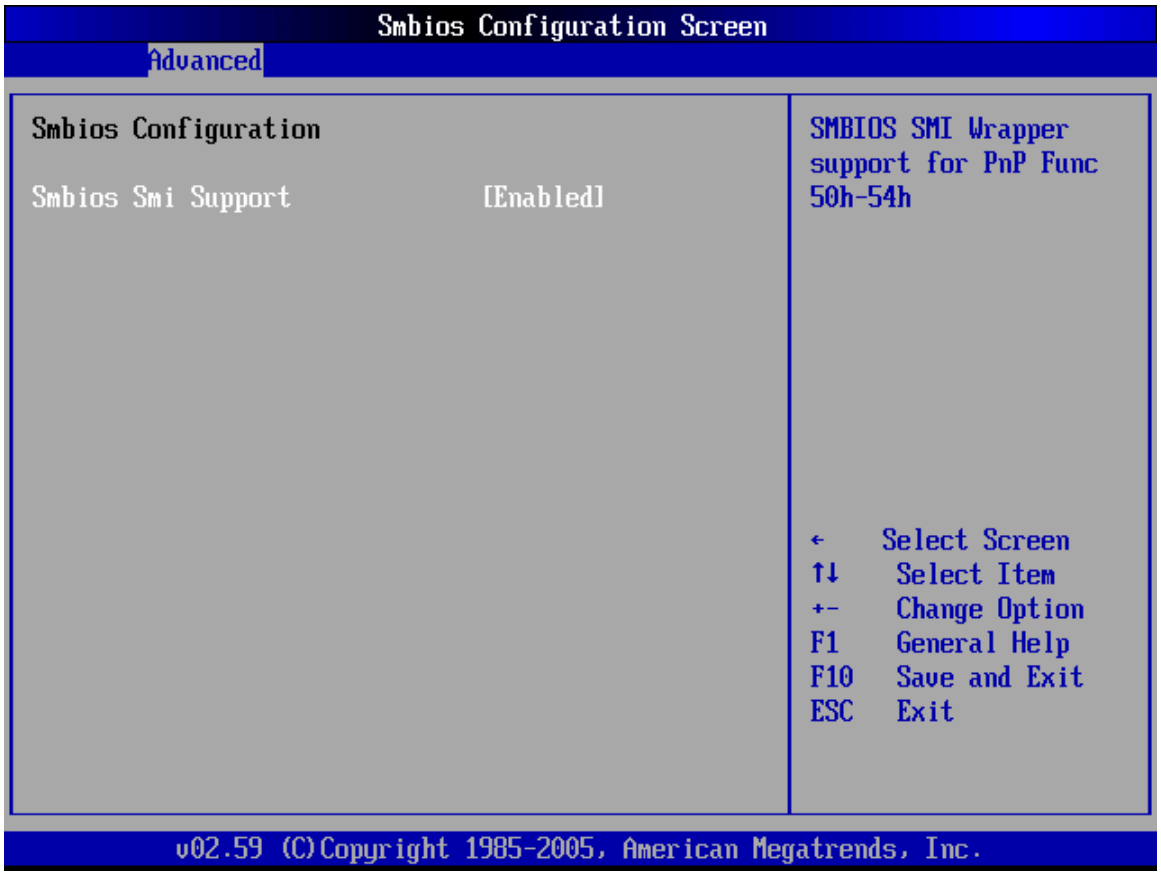
BIOS Menu 8: Hardware Health Configuration

The following system parameters and values are shown. The system parameters that are monitored are:

- **System Temperatures**: The following system temperatures are monitored
  - CPU Temperature
- **Voltages**: The following system voltages are monitored
  - Vcore
  - VMEM
  - +3.30V
  - +5.00V
  - +12.0V
  - VSB
  - VBAT

6.3.6 Smbios

Use the **Smbios Configuration** menu (BIOS Menu 9) to configure SMBIOS parameters.



BIOS Menu 9: Smbios Configuration

➔ **Smbios Smi Support [Enabled]**

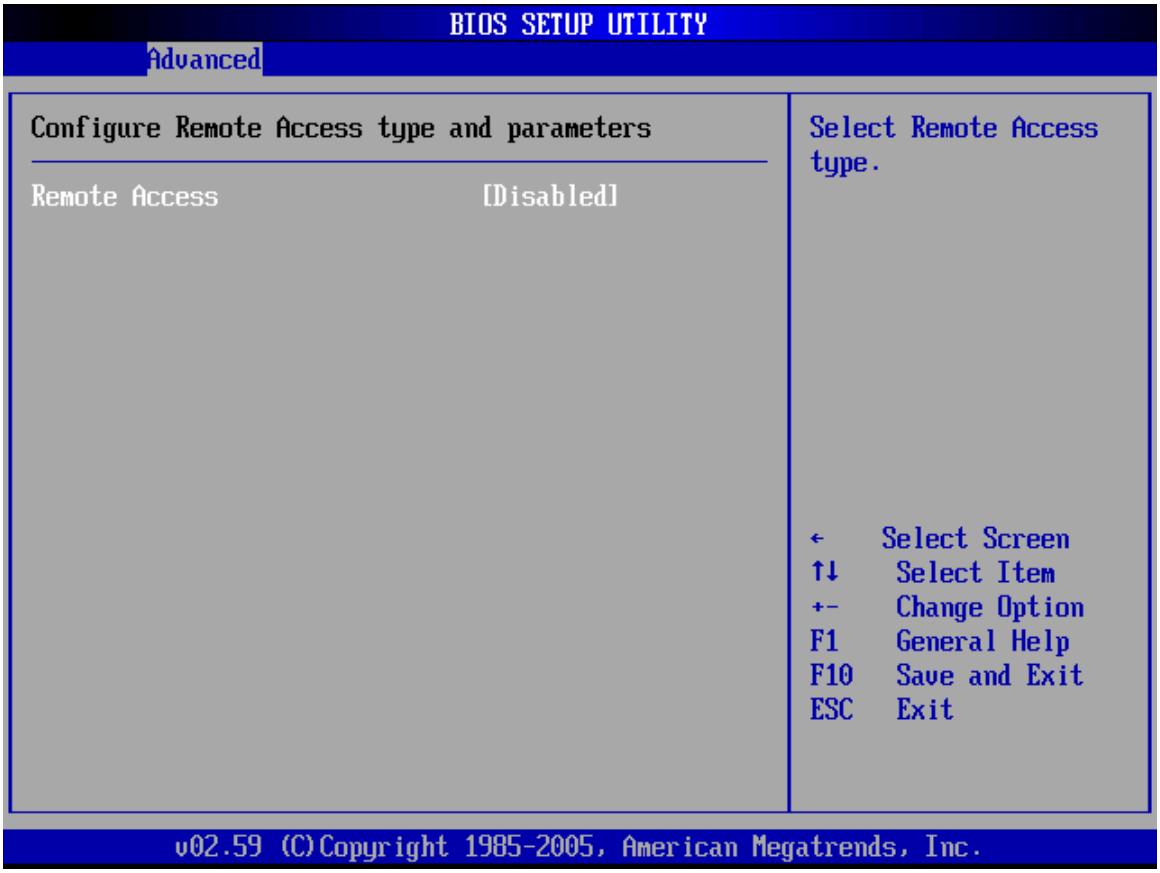
Use the **Smbios Smi Support** to enable the system to support the SMBIOS SMI wrapper for the PnP function 50h – 54h.

➔ **Disabled** SMBIOS SMI wrapper for the PnP function 50h – 54h not supported

➔ **Enabled** **DEFAULT** SMBIOS SMI wrapper for the PnP function 50h – 54h supported

6.3.7 Remote Access Configuration

Use the **Remote Access Configuration** menu (**BIOS Menu 10**) to configure remote access parameters. The **Remote Access Configuration** is an AMIBIOS feature and allows a remote host running a terminal program to display and configure the BIOS settings.



BIOS Menu 10: Remote Access Configuration

➔ **Remote Access [Disabled]**

Use the **Remote Access** option to enable or disable access to the remote functionalities of the system.

➔ **Disabled** **DEFAULT** Remote access is disabled.

➔ **Enabled** Remote access configuration options shown below appear:

- ➔ **Serial Port Number**
- ➔ **Serial Port Mode**
- ➔ **Flow Control**
- ➔ **Redirection after BIOS POST**
- ➔ **Terminal Type**
- ➔ **VT-UTF8 Combo Key Support**
- ➔ **Sredir Memory Display Delay**

These configuration options are discussed below.

➔ **Serial Port Number [COM1]**

Use the **Serial Port Number** option to select the serial port used for remote access.

➔	**COM1**	**DEFAULT**	System is remotely accessed through COM1
➔	**COM2**		System is remotely accessed through COM2
➔	**COM3**		System is remotely accessed through COM3
➔	**COM4**		System is remotely accessed through COM4
➔	**COM5**		System is remotely accessed through COM5
➔	**COM6**		System is remotely accessed through COM6

NOTE: Make sure the selected COM port is enabled through the Super I/O configuration menu.

➔ **Base Address, IRQ [3F8h,4]**

The **Base Address, IRQ** option cannot be configured and only shows the interrupt address of the serial port listed above.

➔ **Serial Port Mode [115200 8,n,1]**

Use the **Serial Port Mode** option to select baud rate through which the console redirection is made. The following configuration options are available

- 115200 8,n,1 **DEFAULT**
- 57600 8,n,1
- 38400 8,n,1
- 19200 8,n,1
- 09600 8,n,1

NOTE:

Identical baud rate setting musts be set on the host (a management computer running a terminal software) and the slave

➔ **Flow Control [None]**

Use the **Flow Control** option to report the flow control method for the console redirection application.

➔	**None**	**DEFAULT**	No control flow,
➔	**Hardware**		Hardware is set as the console redirection
➔	**Software**		Software is set as the console redirection

➔ **Redirection After BIOS POST [Always]**

Use the **Redirection After BIOS POST** option to specify when console redirection should occur.

➔ **Disabled**		The console is not redirected after POST
➔ **Boot Loader**		Redirection is active during POST and during Boot Loader
➔ **Always**	**DEFAULT**	Redirection is always active (Some OSes may not work if set to Always)

➔ **Terminal Type [ANSI]**

Use the **Terminal Type** BIOS option to specify the remote terminal type.

➔ **ANSI**	**DEFAULT**	The target terminal type is ANSI
➔ **VT100**		The target terminal type is VT100
➔ **VT-UTF8**		The target terminal type is VT-UTF8

➔ **VT-UTF8 Combo Key Support [Disabled]**

Use the **VT-UFT8 Combo Key Support** option to enable additional keys that are not provided by VT100 for the PC 101 keyboard.

The VT100 Terminal Definition is the standard convention used to configure and conduct emergency management tasks with UNIX-based servers. VT100 does not support all keys on the standard PC 101-key layout, however. The VT-UTF8 convention makes available additional keys that are not provided by VT100 for the PC 101 keyboard.

➔ **Disabled**		Disables the VT-UTF8 terminal keys
➔ **Enabled**	**DEFAULT**	Enables the VT-UTF8 combination key. Support for ANSI/VT100 terminals

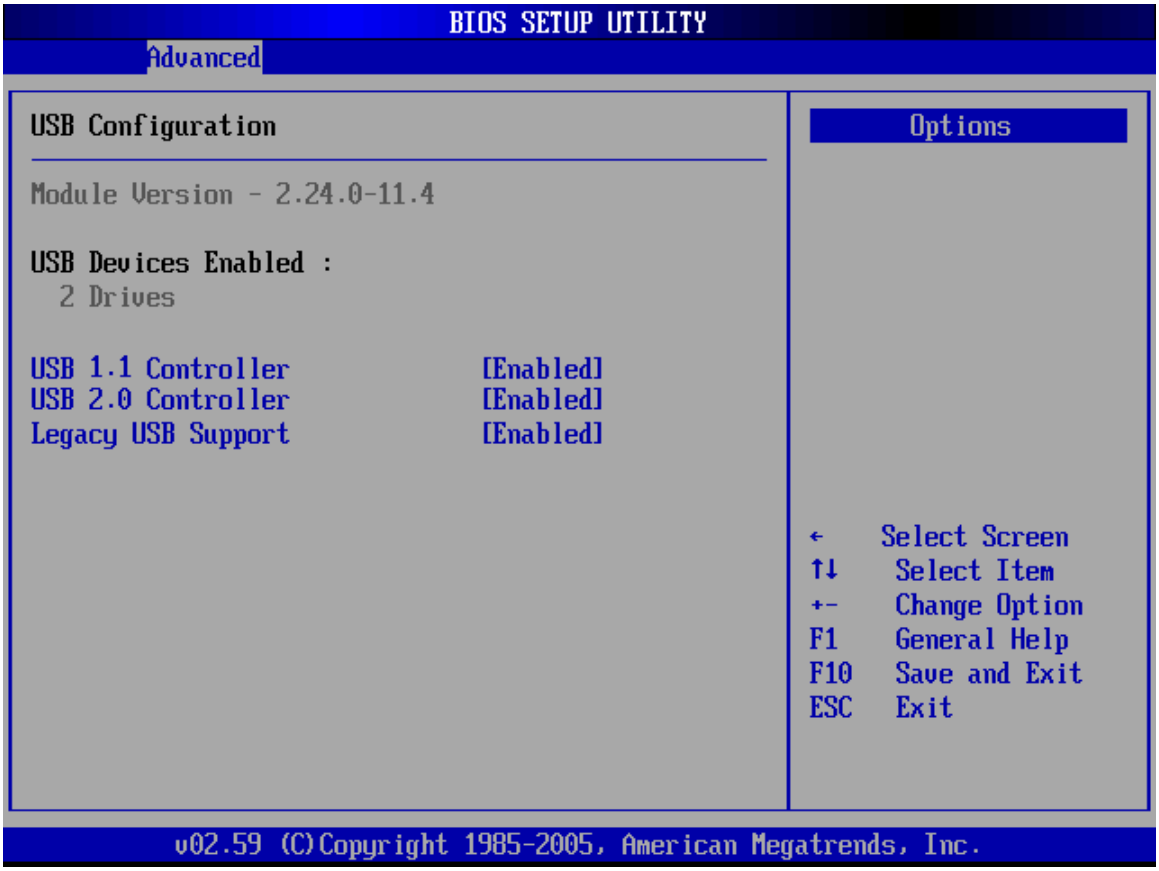
➔ **Sredir Memory Display Delay [Disabled]**

Use the **Sredir Memory Display Delay** option to select the delay before memory information is displayed. Configuration options are listed below

- No Delay **DEFAULT**
- Delay 1 sec
- Delay 2 sec
- Delay 4 sec

6.3.8 USB Configuration

Use the **USB Configuration** menu (**BIOS Menu 11**) to read USB configuration information and configure the USB settings.



BIOS Menu 11: USB Configuration

➔ **USB 1.1 Controller [Enabled]**

The **USB 1.1 Controller** BIOS option enables or disables the USB 1.1 controller

➔ **Disabled** USB 1.1 controller disabled

➔ **Enabled** **DEFAULT** USB 1.1 controller enabled

➔ **USB 2.0 Controller [Enabled]**

The **USB 2.0 Controller** BIOS option enables or disables the USB 2.0 controller

➔ **Disabled** USB function disabled

➔ **Enabled** **DEFAULT** USB function enabled

➔ **Legacy USB Support [Enabled]**

Use the **Legacy USB Support** BIOS option to enable USB mouse and USB keyboard support.

Normally if this option is not enabled, any attached USB mouse or USB keyboard does not become available until a USB compatible operating system is fully booted with all USB drivers loaded. When this option is enabled, any attached USB mouse or USB keyboard can control the system even when there is no USB driver loaded onto the system.

➔ **Disabled** Legacy USB support disabled

➔ **Enabled** **DEFAULT** Legacy USB support enabled

➔ **Auto** Legacy USB support disabled if no USB devices are connected

6.3.9 IT8888 Configuration

Use the **IT8888 Configuration** menu (BIOS Menu 14) to access the Decode IO Spaces and Decode Memory Spaces configuration settings so that the system is compliant with the ISA card implemented on the NOVA-LX.

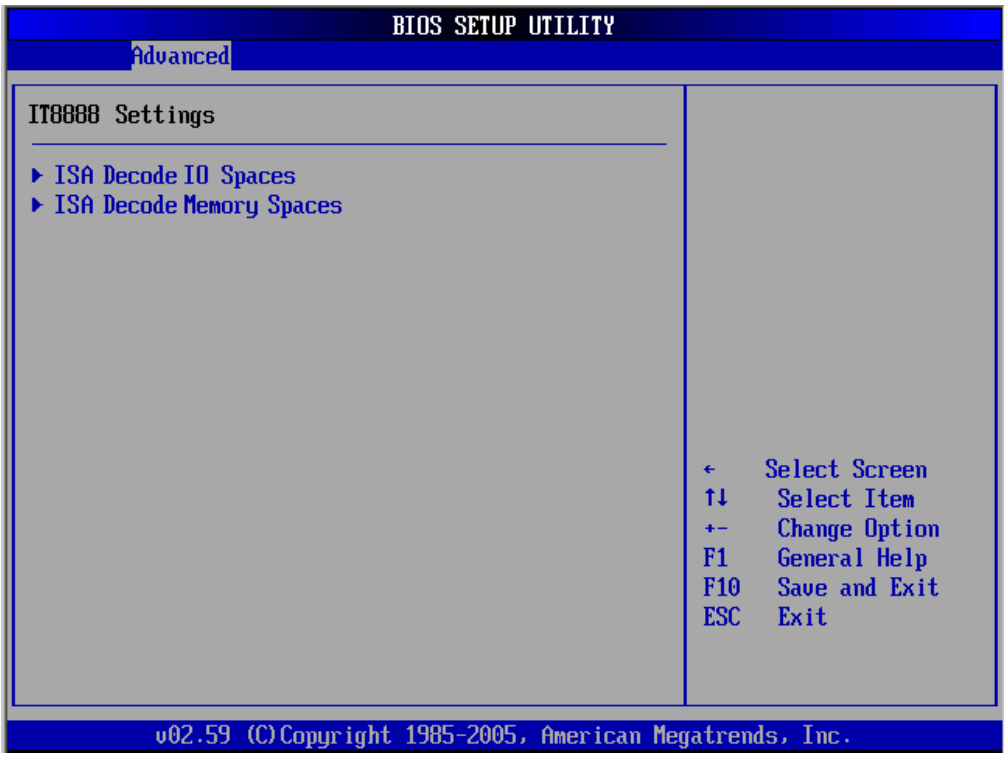


Figure 6-1: IT8888 Configuration

6.3.9.1 ISA Decode IO Spaces

NOTE:

To set the correct settings in this section, please refer to the reference manual that came with the ISA card being implemented on the NOVA-LX. These settings must are user defined.

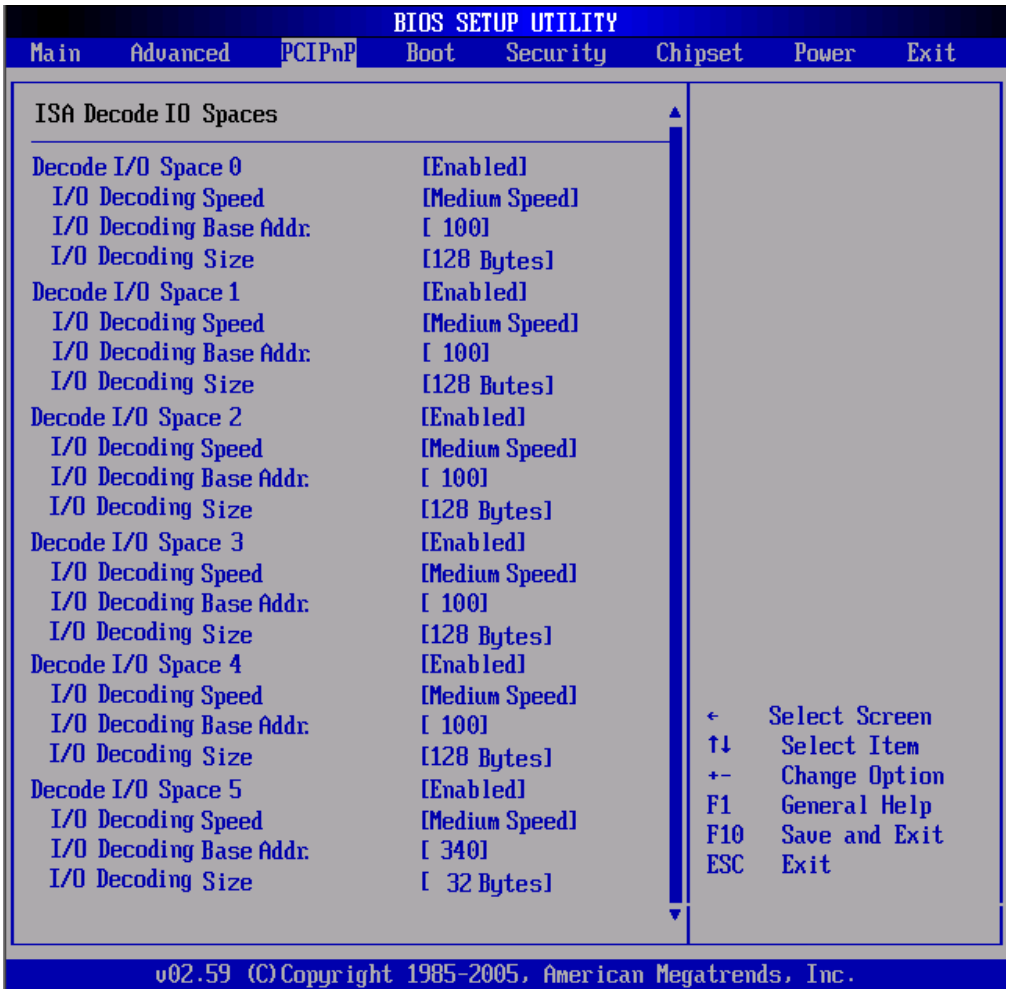

BIOS SETUP UTILITY
Main Advanced PCIPnP Boot Security Chipset Power Exit
ISA Decode IO Spaces
Decode I/O Space 0 [Enabled]
I/O Decoding Speed [Medium Speed]
I/O Decoding Base Addr. [100]
I/O Decoding Size [128 Bytes]
Decode I/O Space 1 [Enabled]
I/O Decoding Speed [Medium Speed]
I/O Decoding Base Addr. [100]
I/O Decoding Size [128 Bytes]
Decode I/O Space 2 [Enabled]
I/O Decoding Speed [Medium Speed]
I/O Decoding Base Addr. [100]
I/O Decoding Size [128 Bytes]
Decode I/O Space 3 [Enabled]
I/O Decoding Speed [Medium Speed]
I/O Decoding Base Addr. [100]
I/O Decoding Size [128 Bytes]
Decode I/O Space 4 [Enabled]
I/O Decoding Speed [Medium Speed]
I/O Decoding Base Addr. [100]
I/O Decoding Size [128 Bytes]
Decode I/O Space 5 [Enabled]
I/O Decoding Speed [Medium Speed]
I/O Decoding Base Addr. [340]
I/O Decoding Size [32 Bytes]
← Select Screen
↑↓ Select Item
+- Change Option
F1 General Help
F10 Save and Exit
ESC Exit
v02.59 (C)Copyright 1985-2005, American Megatrends, Inc.

Figure 6-2: Decode IO Spaces

➔ **Decode I/O Space n [Enabled]**

NOTE:

Please refer to the reference material that came with the ISA card to ensure the correct configuration settings are made.

Use the **Decode I/O Space n** option to enable the system to decode the nth space on the ISA card.

➔	**Disabled**		Decoding of the nth space is disabled
➔	**Enabled**	**DEFAULT**	Decoding of the nth space is enabled

➔ **I/O Decoding Speed**

NOTE:

Please refer to the reference material that came with the ISA card to ensure the correct configuration settings are made.

Use the **I/O Decoding Speed** option to specify the speed at which the nth I/O space that must be decoded. The following options are available:

- Subtractive Speed
- Slow Speed
- Medium Speed
- Fast Speed

➔ **I/O Decoding Base Address**

Use the **I/O Decoding Base Address** option to specify the base address at which the nth I/O space that must be decoded. The address must be a four-digit number between **0000** and **FFFF**.

➔ **I/O Decoding Size**

NOTE:

Please refer to the reference material that came with the ISA card to ensure the correct configuration settings are made.

Use the **I/O Decoding Size** option to specify the decoding size for the nth I/O space that must be decoded. The following options are available:

- 1 Byte
- 2 Bytes
- 4 Bytes
- 8 Bytes
- 16 Bytes
- 32 Bytes
- 64 Bytes
- 128 Bytes

6.3.9.2 ISA Decode Memory Spaces

NOTE:

To set the correct settings in this section, please refer to the reference manual that came with the ISA card being implemented on the NOVA-LX. These settings must are user defined.

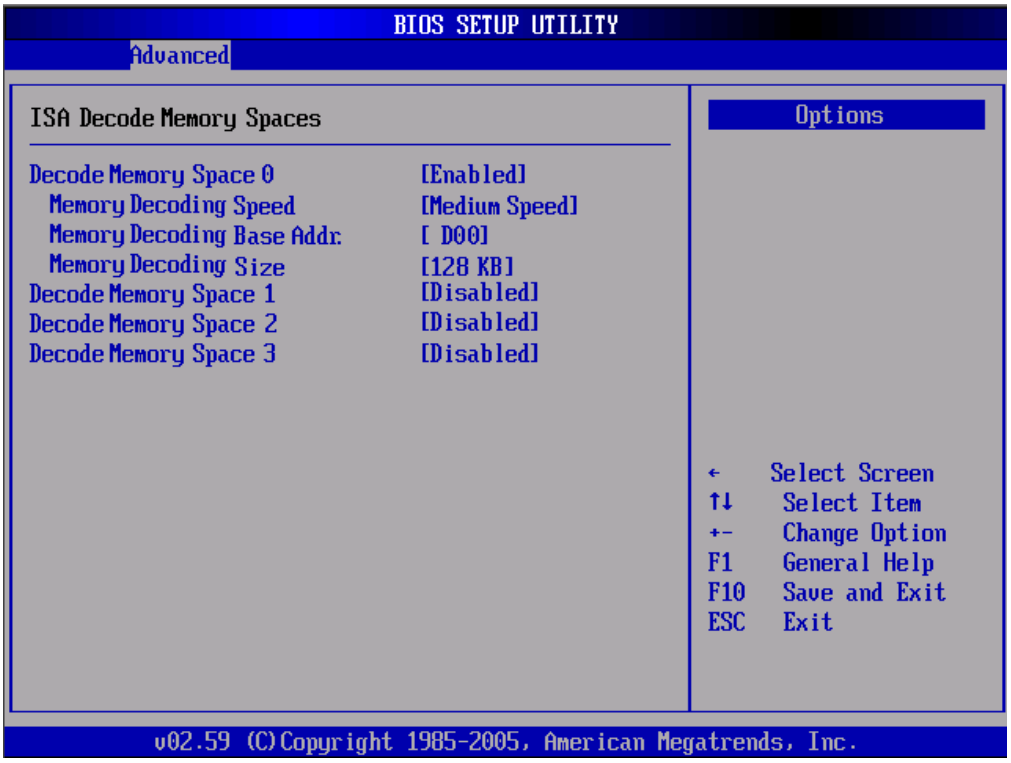


Figure 6-3: ISA Decode Memory Spacesk,l

➔ **Decode Memory Space n [Enabled]**

NOTE:

Please refer to the reference material that came with the ISA card to ensure the correct configuration settings are made.

Use the **Decode Memory Space n** option to enable the system to decode the nth memory space on the ISA card.

➔	**Disabled**		Decoding of the nth memory space is disabled
➔	**Enabled**	**DEFAULT**	Decoding of the nth memory space is enabled

➔ **Memory Decoding Speed**

NOTE:

Please refer to the reference material that came with the ISA card to ensure the correct configuration settings are made.

Use the **Memory Decoding Speed** option to specify the speed at which the nth memory space that must be decoded. The following options are available:

- Subtractive Speed
- Slow Speed
- Medium Speed
- Fast Speed

➔ **Memory Decoding Base Address**

Use the **Memory Decoding Base Address** option to specify the base address at which the nth memory space that must be decoded. The address must be a four-digit number between **0000** and **FFFF**.

➔ **Memory Decoding Size**

NOTE:

Please refer to the reference material that came with the ISA card to ensure the correct configuration settings are made.

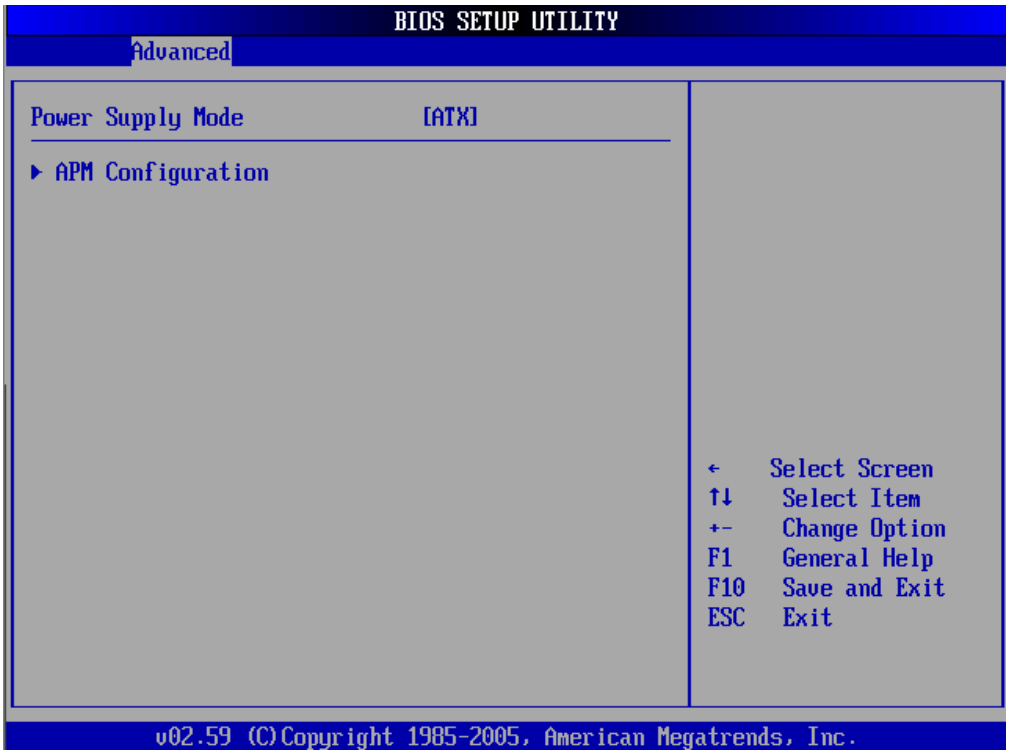
Use the **Memory Decoding Size** option to specify the decoding size for the nth memory space that must be decoded. The following options are available:

- 1 Byte
- 2 Bytes

- 4 Bytes
- 8 Bytes
- 16 Bytes
- 32 Bytes
- 64 Bytes
- 128 Bytes

6.3.10 Power

Use the Power menu (BIOS Menu 12) to access the Advanced Power Management (APM) menu.



BIOS Menu 12: Power Configuration

➔ **Power Supply Mode [ATX]**

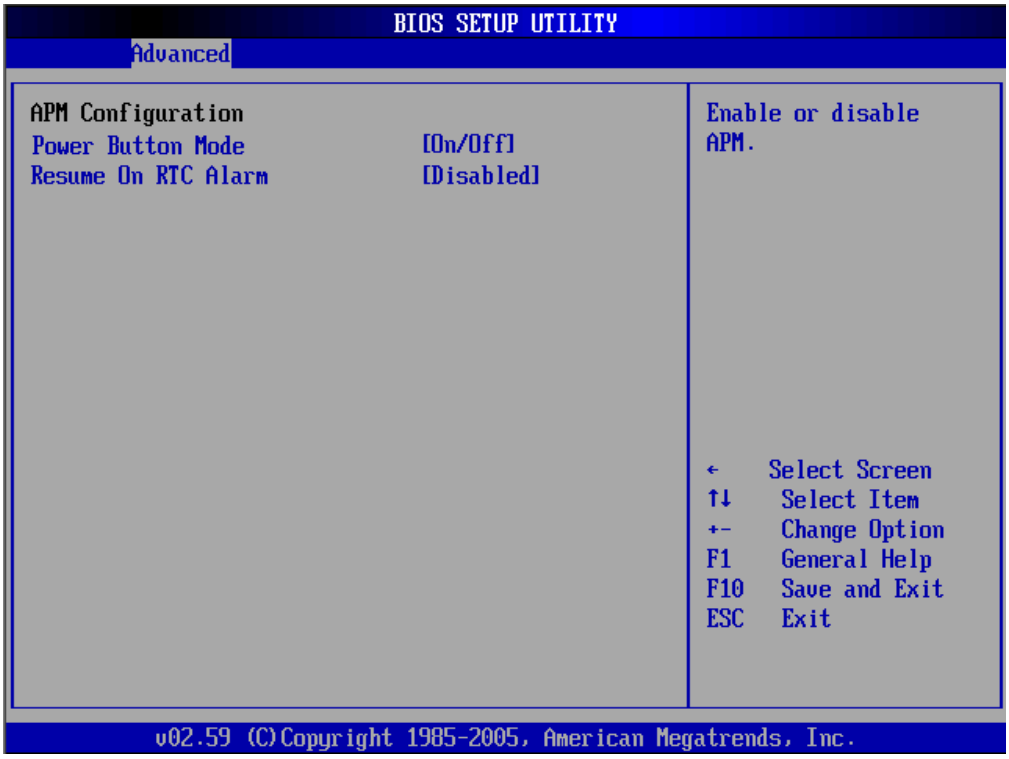
Use the **Power Supply Mode** BIOS option to to select the power supply that is connected to the system.

➔ **AT** **DEFAULT** An AT power supply is connected to the system

➔ **ATX** An ATX power supply is connected to the system

6.3.10.1 APM Configuration

Use the APM Configuration menu (BIOS Menu 13) to access set the APM configuration settings.



BIOS Menu 13: APM Configuration

➔ **Power Button Mode [Instant Off]**

The **Power Button Mode** BIOS specifies how the power button functions.

➔ **Instant Off** **DEFAULT** When the power button is pressed the system turns off immediately

➔ **Soft Off after 4sec override** The power button must be held for

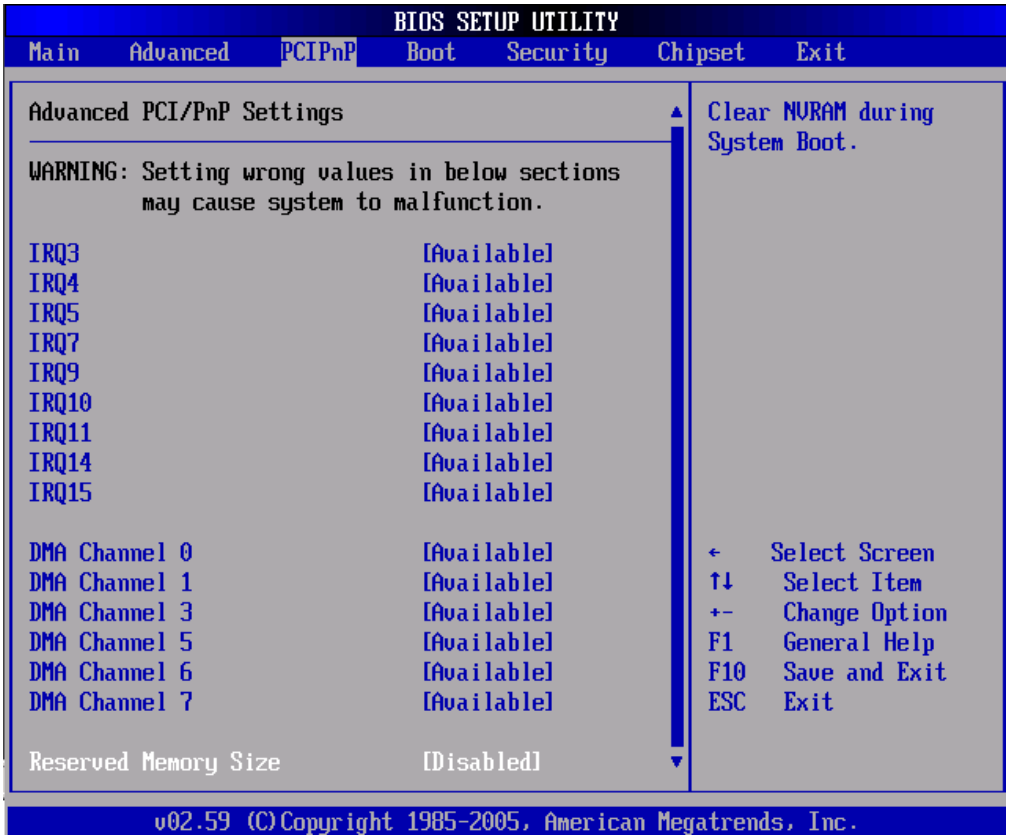
4 seconds to be turned off or it goes into a sleep state.

6.4 PCI/PnP

Use the PCI/PnP menu (BIOS Menu 14) to configure advanced PCI and PnP settings.

WARNING:

Setting wrong values for the BIOS selections in the PCIPnP BIOS menu may cause the system to malfunction.



BIOS Menu 14: PCI/PnP Configuration

➔ **IRQ# [Available]**

Use the **IRQ#** address to specify what IRQs can be assigned to a particular peripheral device.

➔ **Available**	**DEFAULT**	The specified IRQ is available to be used by PCI/PnP devices
➔ **Reserved**		The specified IRQ is reserved for use by Legacy ISA devices

Available IRQ addresses are:

- IRQ3
- IRQ4
- IRQ5
- IRQ7
- IRQ9
- IRQ10
- IRQ 11
- IRQ 14
- IRQ 15

➔ **DMA Channel# [Available]**

Use the **DMA Channel#** option to assign a specific DMA channel to a particular PCI/PnP device.

➔ **Available**	**DEFAULT**	The specified DMA is available to be used by PCI/PnP devices
➔ **Reserved**		The specified DMA is reserved for use by Legacy ISA devices

Available DMA Channels are:

- DM Channel 0

- DM Channel 1
- DM Channel 3
- DM Channel 5
- DM Channel 6
- DM Channel 7

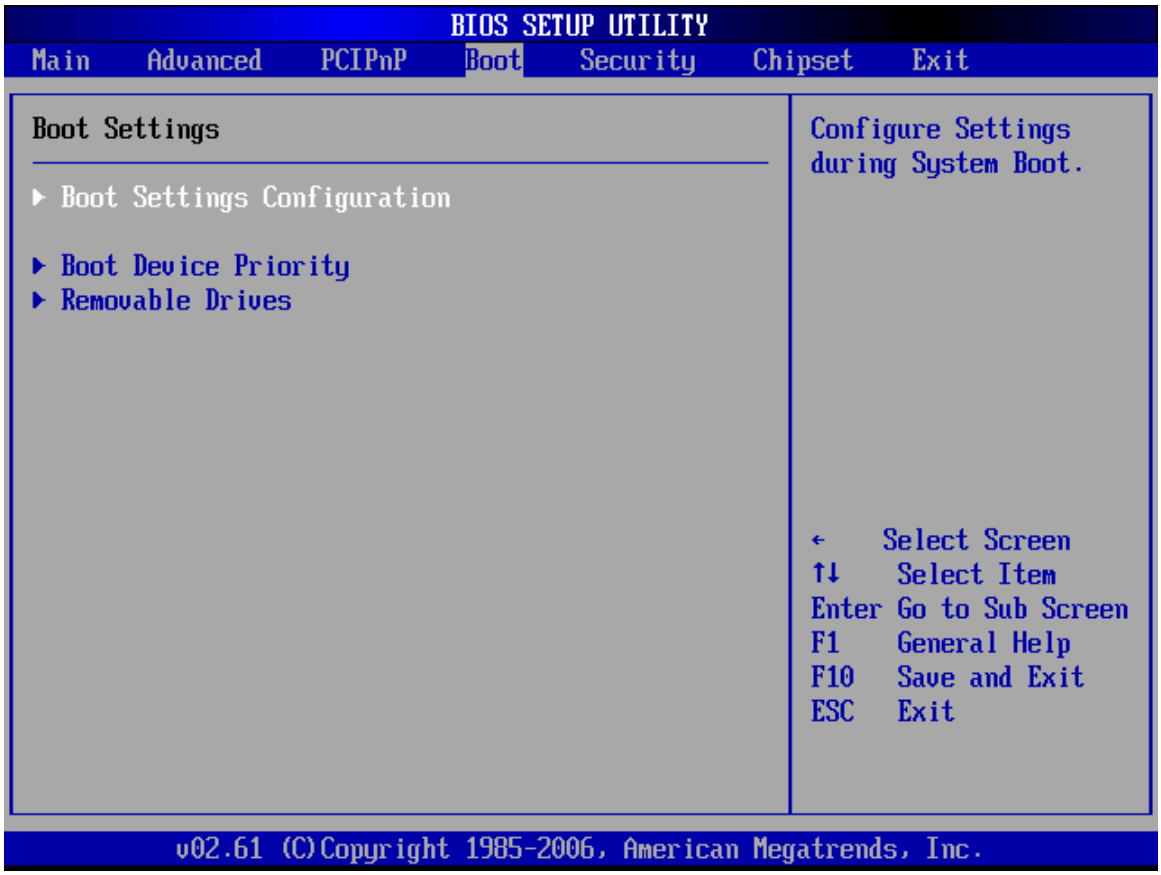
➔ **Reserved Memory Size [Disabled]**

Use the **Reserved Memory Size** BIOS option to specify the amount of memory that should be reserved for legacy ISA devices.

➔	**Disabled**	**DEFAULT**	No memory block reserved for legacy ISA devices
➔	**16K**		16KB reserved for legacy ISA devices
➔	**32K**		32KB reserved for legacy ISA devices
➔	**64K**		54KB reserved for legacy ISA devices

6.5 Boot

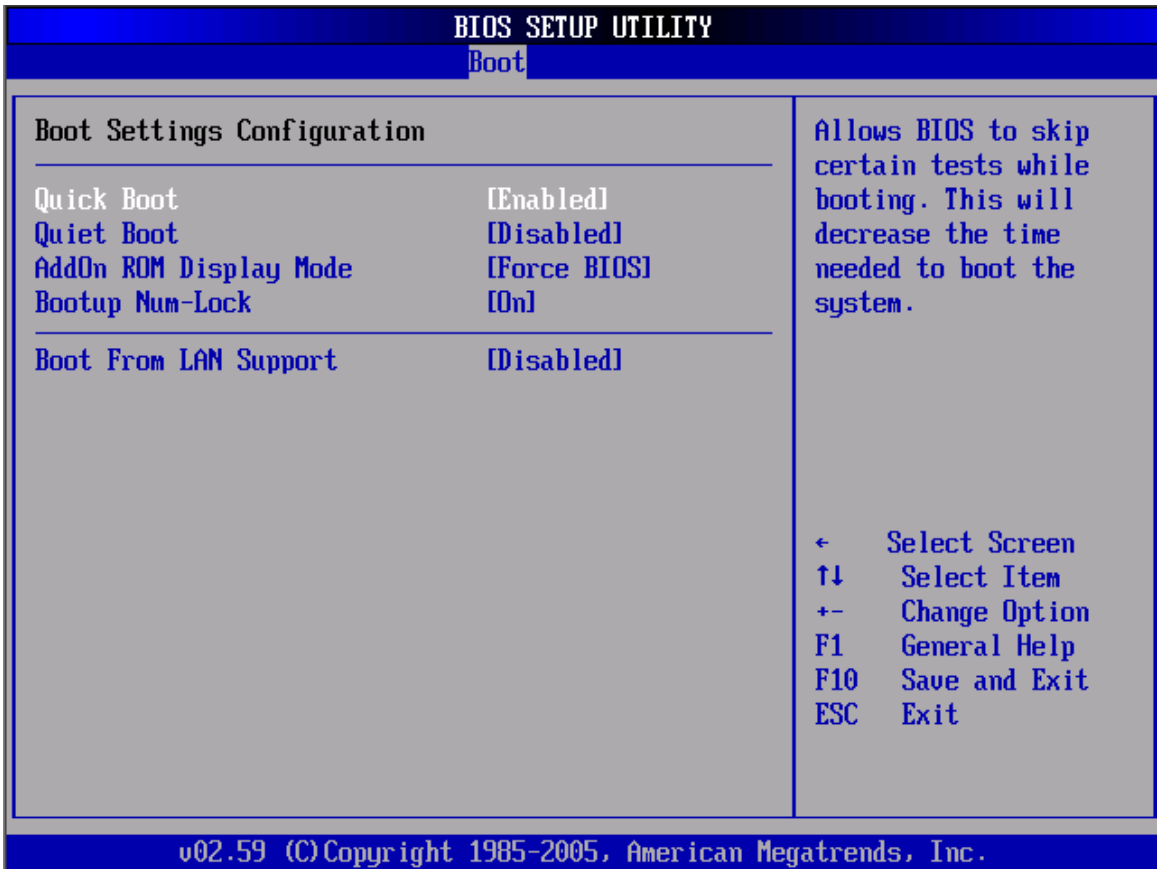
Use the Boot menu (BIOS Menu 15) to configure system boot options.



BIOS Menu 15: Boot

6.5.1 Boot Settings Configuration

Use the Boot Settings Configuration menu (BIOS Menu 15) to configure advanced system boot options.


BIOS SETUP UTILITY
Boot
Boot Settings Configuration
Quick Boot [Enabled]
Quiet Boot [Disabled]
AddOn ROM Display Mode [Force BIOS]
Bootup Num-Lock [On]
Boot From LAN Support [Disabled]
Allows BIOS to skip certain tests while booting. This will decrease the time needed to boot the system.
← Select Screen
↑↓ Select Item
+- Change Option
F1 General Help
F10 Save and Exit
ESC Exit
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BIOS Menu 16: Boot Settings Configuration

➔ **Quick Boot [Enabled]**

Use the **Quick Boot** BIOS option to make the computer speed up the boot process.

➔ **Disabled**		No POST procedures are skipped
➔ **Enabled**	**DEFAULT**	Some POST procedures are skipped to decrease the system boot time

➔ **Quiet Boot [Disabled]**

Use the **Quiet Boot** BIOS option to select the screen display when the system boots.

➔ **Disabled**	**DEFAULT**	Normal POST messages displayed

➔ **Enabled** OEM Logo displayed instead of POST messages

➔ **AddOn ROM Display Mode [Force BIOS]**

Use the **AddOn ROM Display Mode** option to allow add-on ROM (read-only memory) messages to be displayed.

➔ **Force BIOS** **DEFAULT** The system forces third party BIOS to display during system boot.

➔ **Keep Current** The system displays normal information during system boot.

➔ **Bootup Num-Lock [On]**

Use the **Bootup Num-Lock** BIOS option to specify if the number lock setting must be modified during boot up.

➔ **Off** Does not enable the keyboard Number Lock automatically. To use the 10-keys on the keyboard, press the Number Lock key located on the upper left-hand corner of the 10-key pad. The Number Lock LED on the keyboard lights up when the Number Lock is engaged.

➔ **On** **DEFAULT** Allows the Number Lock on the keyboard to be enabled automatically when the computer system boots up. This allows the immediate use of the 10-key numeric keypad located on the right side of the keyboard. To confirm this, the Number Lock LED light on the keyboard is lit.

➔ **Boot From LAN Support [Disabled]**

Use the **BOOT From LAN Support** option to enable the system to be booted from a remote system.

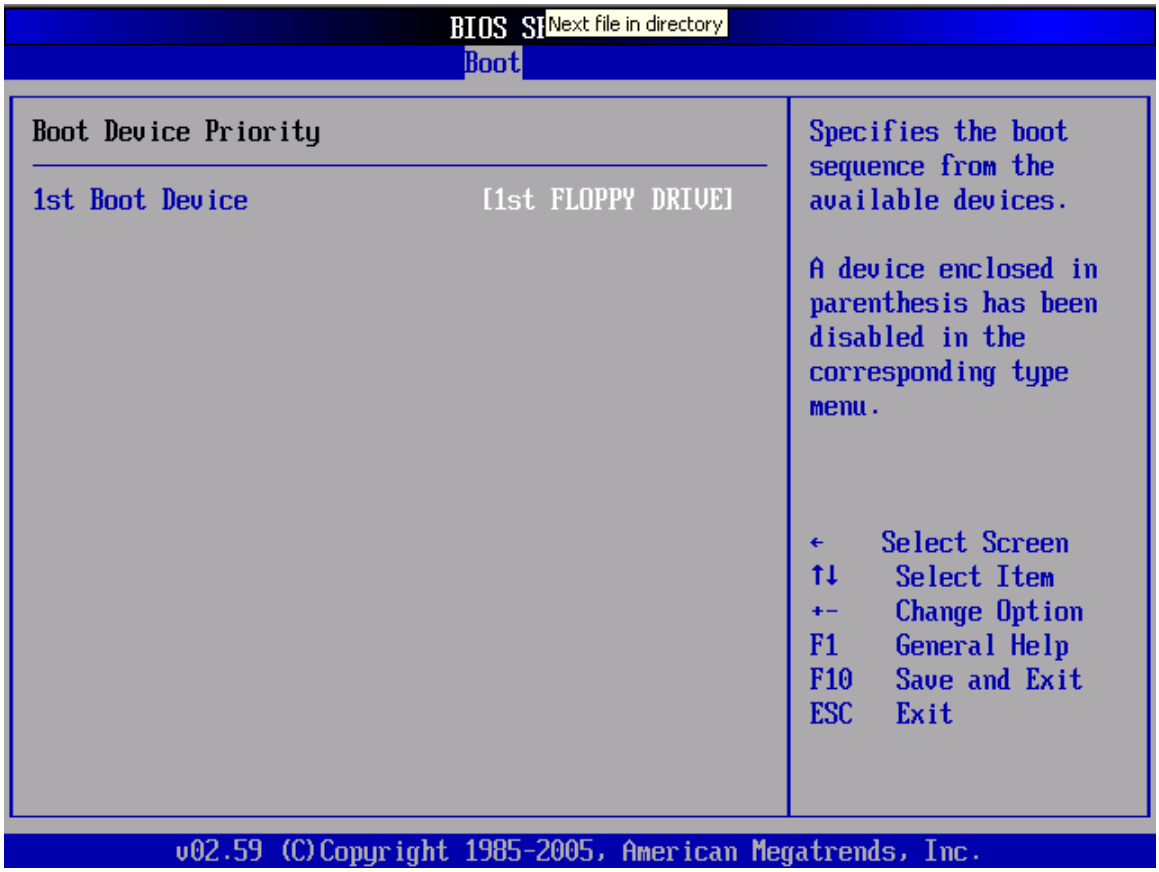
➔ **Disabled** (Default) Cannot be booted from a remote system through the LAN

➔ **Enabled** (Default) Can be booted from a remote system through the LAN

6.5.2 Boot Device Priority

Use the **Boot Device Priority** menu (**BIOS Menu 17**) to specify the boot sequence from the available devices. Possible boot devices may include:

- 1st FLOPPY DRIVE
- HDD
- CD/DVD


BIOS SI
Next file in directory
Boot
Boot Device Priority
1st Boot Device
[1st FLOPPY DRIVE]
Specifies the boot sequence from the available devices.
A device enclosed in parenthesis has been disabled in the corresponding type menu.
← Select Screen
↑↓ Select Item
+- Change Option
F1 General Help
F10 Save and Exit
ESC Exit
v02.59 (C)Copyright 1985-2005, American Megatrends, Inc.

BIOS Menu 17: Boot Device Priority Settings

6.5.3 Removable Drives

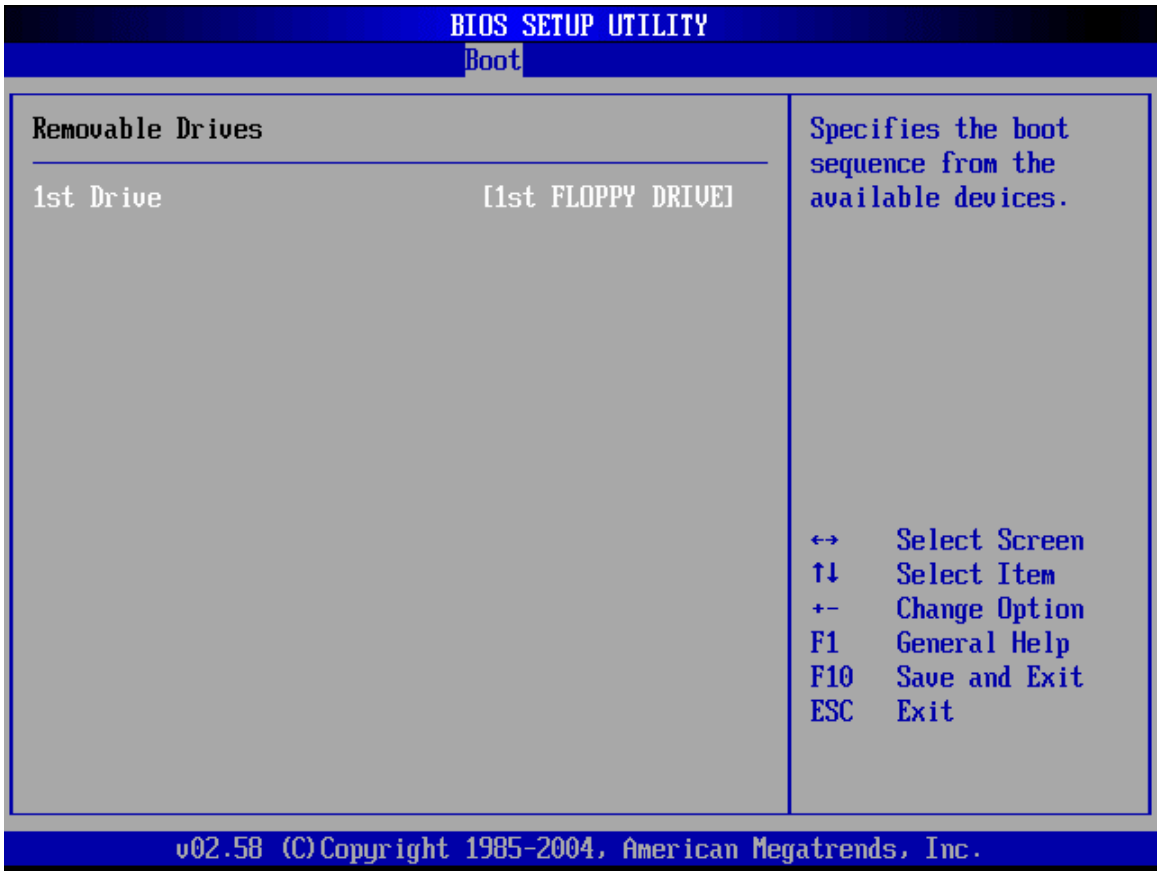
Use the **Removable Drives** menu (**BIOS Menu 18**) to specify the boot sequence of the available FDDs. When the menu is opened, the FDDs connected to the system are listed as shown below:

- 1st Drive [1st FLOPPY DRIVE]
- 2nd Drive [2nd FLOPPY DRIVE]

NOTE:

Only the drives connected to the system are shown. For example, if only one FDD is connected only “**1st Drive**” is listed.

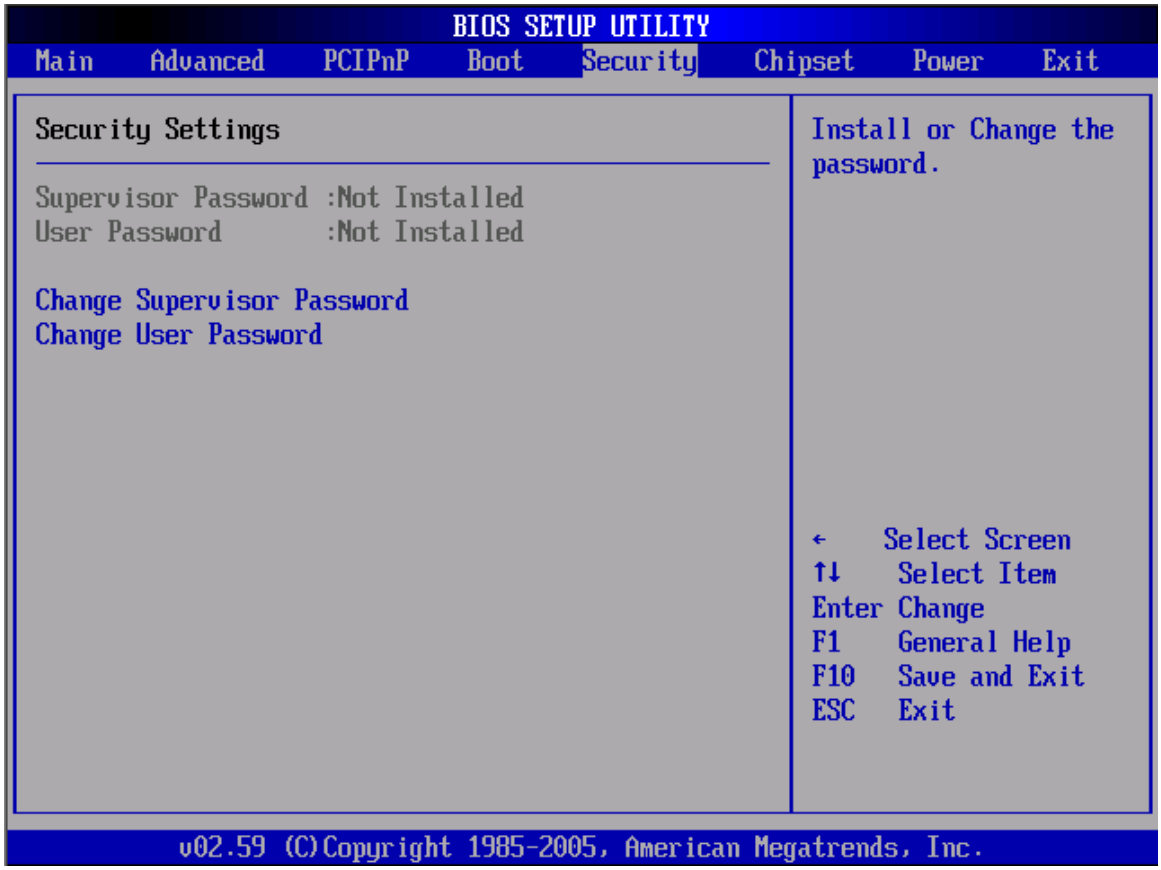
The boot sequence from the available devices is selected. If the “**1st Drive**” option is selected a list of available FDDs is shown. Select the first FDD the system boots from. If the “**1st Drive**” is not used for booting this option may be disabled.



BIOS Menu 18: Removable Drives

6.6 Security

Use the Security menu (BIOS Menu 19) to set system and user passwords.



BIOS Menu 19: Security

➔ Change Supervisor Password

Use the **Change Supervisor Password** to set or change a supervisor password. The default for this option is **Not Installed**. If a supervisor password must be installed, select this field and enter the password. After the password has been added, **Install** appears next to **Change Supervisor Password**.

➔ Change User Password

Use the **Change User Password** to set or change a user password. The default for this option is **Not Installed**. If a user password must be installed, select this field and enter the password. After the password has been added, **Install** appears next to **Change User Password**.

➔ **Boot Sector Virus Protection [Disabled]**

Use the **Boot Sector Virus Protection** to enable or disable boot sector protection.

➔	**Disabled**	**DEFAULT**	Disables the boot sector virus protection
➔	**Enabled**		Enables the boot sector virus protection

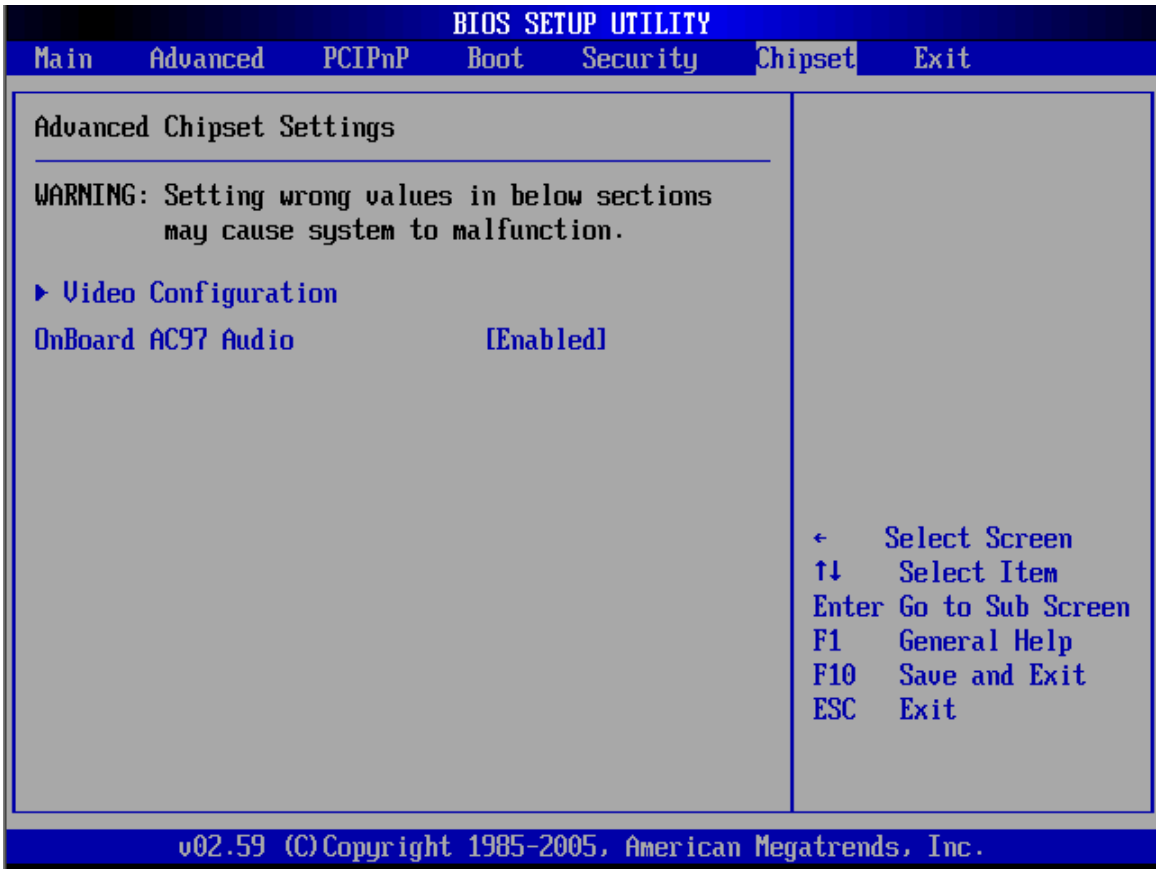
6.7 Chipset

Use the **Chipset** menu (**BIOS Menu 20**) to access the NorthBridge and SouthBridge configuration menus

---

WARNING!

Setting the wrong values for the Chipset BIOS selections in the Chipset BIOS menu may cause the system to malfunction.


BIOS SETUP UTILITY
Main Advanced PCIPnP Boot Security Chipset Exit
Advanced Chipset Settings
WARNING: Setting wrong values in below sections
may cause system to malfunction.
▶ Video Configuration
OnBoard AC97 Audio [Enabled]
← Select Screen
↑↓ Select Item
Enter Go to Sub Screen
F1 General Help
F10 Save and Exit
ESC Exit
v02.59 (C)Copyright 1985-2005, American Megatrends, Inc.

BIOS Menu 20: Chipset

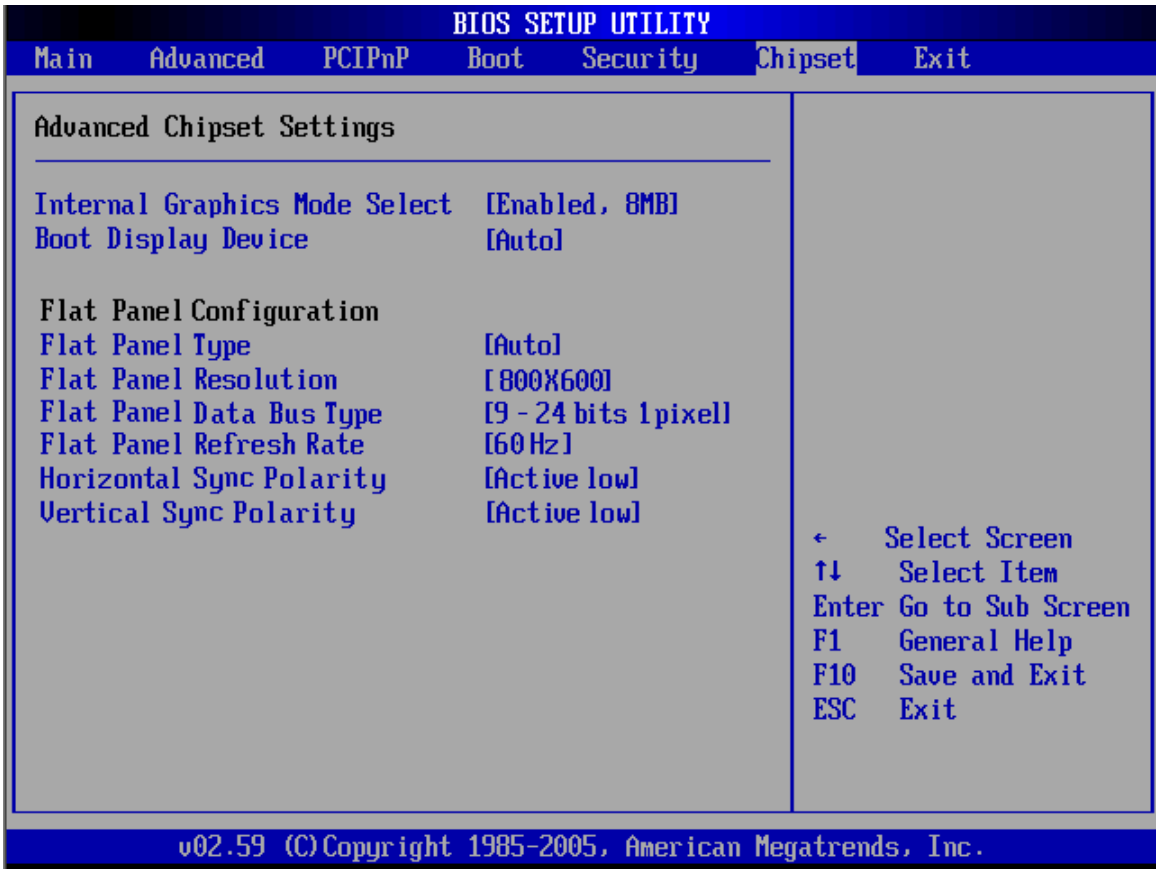
➔ **OnBoard AC97 Audio [Enabled]**

The **OnBoard AC97 Audio** option enables or disables the AC’97 CODEC.

➔	**Disabled**		The onboard AC’97 is disabled
➔	**Auto**	**DEFAULT**	The onboard AC’97 automatically detected and enabled

6.7.1 Video Configuration

Use the **Video Configuration** menu (BIOS Menu 21) to configure the chipset settings on the chipset so that they comply with the display device connected to the system.


BIOS SETUP UTILITY
Main Advanced PCIPnP Boot Security Chipset Exit
Advanced Chipset Settings
Internal Graphics Mode Select [Enabled, 8MB]
Boot Display Device [Auto]
Flat Panel Configuration
Flat Panel Type [Auto]
Flat Panel Resolution [800X600]
Flat Panel Data Bus Type [9 - 24 bits 1pixel]
Flat Panel Refresh Rate [60 Hz]
Horizontal Sync Polarity [Active low]
Vertical Sync Polarity [Active low]
← Select Screen
↑↓ Select Item
Enter Go to Sub Screen
F1 General Help
F10 Save and Exit
ESC Exit
v02.59 (C)Copyright 1985-2005, American Megatrends, Inc.

BIOS Menu 21: Video Configuration

➔ **Internal Graphics Memory [32]**

The **Internal Graphic Memory** option to specify the amount of internal memory is allocated to the graphics. Insert an EVEN number of MB in this entry between 2 and 254.

➔ **Boot Display Type [Panel + CRT]**

The **Boot Display Type** BIOS option selects the display device the system uses when it boots. The available options are listed below:

- CRT
- Flat Panel
- Panel + CRT **DEFAULT**

➔ **Flat Panel Type [640x480 18bit LVDS]**

Use the **Flat Panel Type** option to specify the flat panel PC type being used. The following options are available:

- TFT
- LVDS
- Auto **DEFAULT**

➔ **Flat Panel Resolution**

Use the **LCD Panel Resolution** to specify the LCD panel resolution. Configuration options are listed below:

- 320 x 240
- 640 x 480
- 800 x 600
- 1024 x 768
- 1152 x 864
- 1280 x 1024
- 1600 x 1200

➔ **Flat Panel Data Bus Type**

NOTE:

Please refer to the reference material that came with the flat panel to determine the correct configuration settings.

Use the **Flat Panel Data Bus Type** to specify the panel data bus width, and data type. Configuration options are listed below:

- 9-24 bits, 1 pixel/clock
- 18, 24 bits, 2 pixels/clock

➔ **Flat Panel Refresh Rate**

NOTE:

Please refer to the reference material that came with the flat panel to determine the correct configuration settings.

Use the **Flat Panel Refresh Rate** to specify the refresh rate required by the panel. Configuration options are listed below:

- 60 Hz
- 70 Hz
- 72 Hz
- 75 Hz
- 85 Hz
- 90 Hz
- 100 Hz

➔ **Horizontal Sync Polarity [Active low]**

Use the **Horizontal Sync Polarity** option to select the active polarity of the HSYNC signal to the panel.

➔	**Active low**	**DEFAULT**	HSYNC signal is set as low
➔	**Active high**		HSYNC signal is set as high

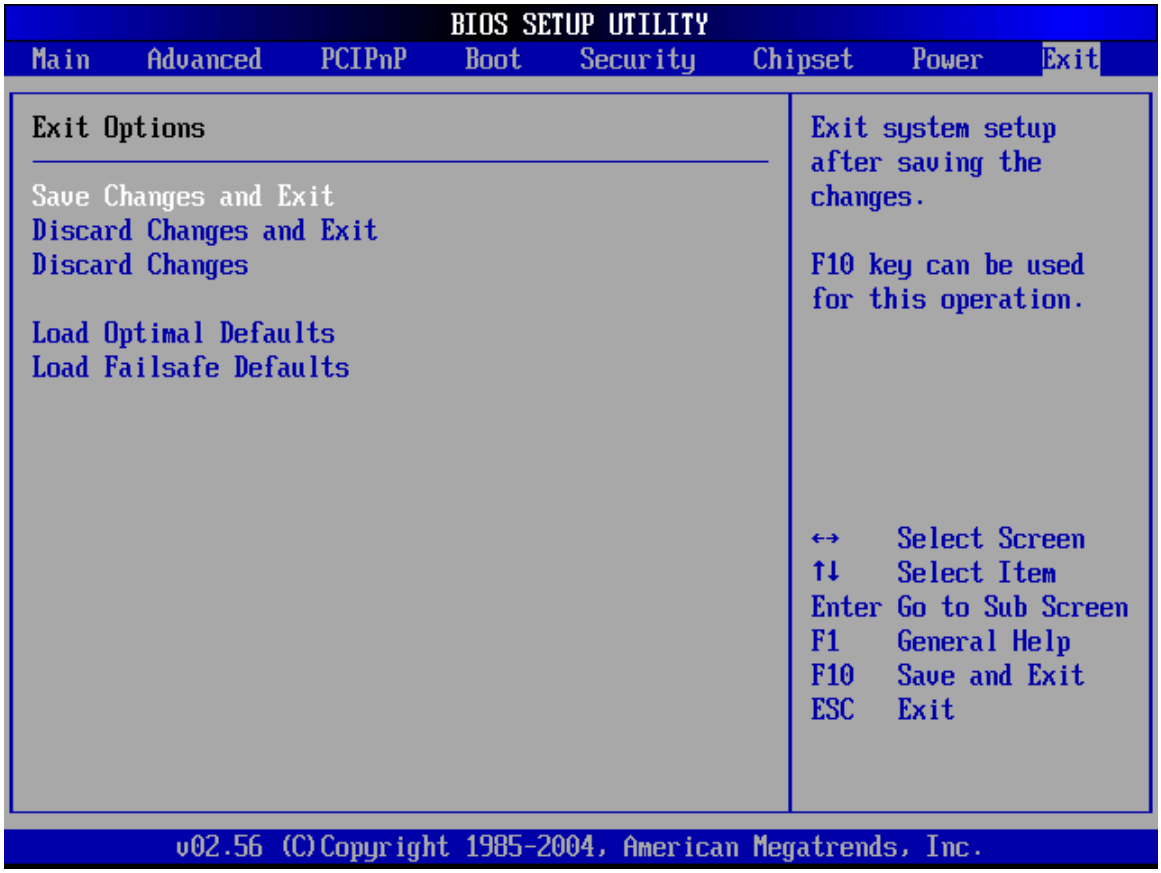
➔ **Vertical Sync Polarity [Active low]**

Use the **Vertical Sync Polarity** option to select the active polarity of the VSYNC signal to the panel.

➔	**Active low**	**DEFAULT**	VSYNC signal is set as low
➔	**Active high**		VSYNC signal is set as high

6.8 Exit

Use the **Exit** menu (**BIOS Menu 22**) to load default BIOS values, optimal failsafe values and to save configuration changes.


BIOS SETUP UTILITY
Main Advanced PCIPnP Boot Security Chipset Power Exit
Exit Options
Save Changes and Exit
Discard Changes and Exit
Discard Changes
Load Optimal Defaults
Load Failsafe Defaults
Exit system setup after saving the changes.
F10 key can be used for this operation.
↔ Select Screen
↑↓ Select Item
Enter Go to Sub Screen
F1 General Help
F10 Save and Exit
ESC Exit
v02.56 (C)Copyright 1985-2004, American Megatrends, Inc.

BIOS Menu 22:Exit

➔ **Save Changes and Exit**

Use the **Save Changes and Exit** option to save the changes made to the BIOS options and to exit the BIOS configuration setup program.

➔ **Discard Changes and Exit**

Use the **Discard Changes and Exit** option to exit the BIOS configuration setup program without saving the changes made to the system.

➔ **Discard Changes**

Use the **Discard Changes** option to discard the changes and remain in the BIOS configuration setup program.

➔ **Load Optimal Defaults**

Use the **Load Optimal Defaults** option to load the optimal default values for each of the parameters on the Setup menus. **F9 key can be used for this operation.**

➔ **Load Failsafe Defaults**

Use the **Load Failsafe Defaults** option to load failsafe default values for each of the parameters on the Setup menus. **F8 key can be used for this operation.**

Chapter

7

Driver Installation

7.1 Available Software Drivers

NOTE:

The content of the CD may vary throughout the life cycle of the product and is subject to change without prior notice. Visit the IEI website or contact technical support for the latest updates.

The NOVA-LX CPU module has six software drivers:

- LAN driver
- Audio driver
- VGA driver

All four drivers can be found on the CD that came with the embedded module. To install the drivers please follow the instructions in the sections below.

7.2 Open the Device Manager in Windows

To install the drivers, please access the **WINDOWS DEVICE MANAGER**. To do this, follow the instructions below.

Step 1: Insert the CD into a CD drive of the system that contains the NOVA-LX.

Step 2: Open **WINDOWS CONTROL PANEL**. (See **Figure 7-1**)

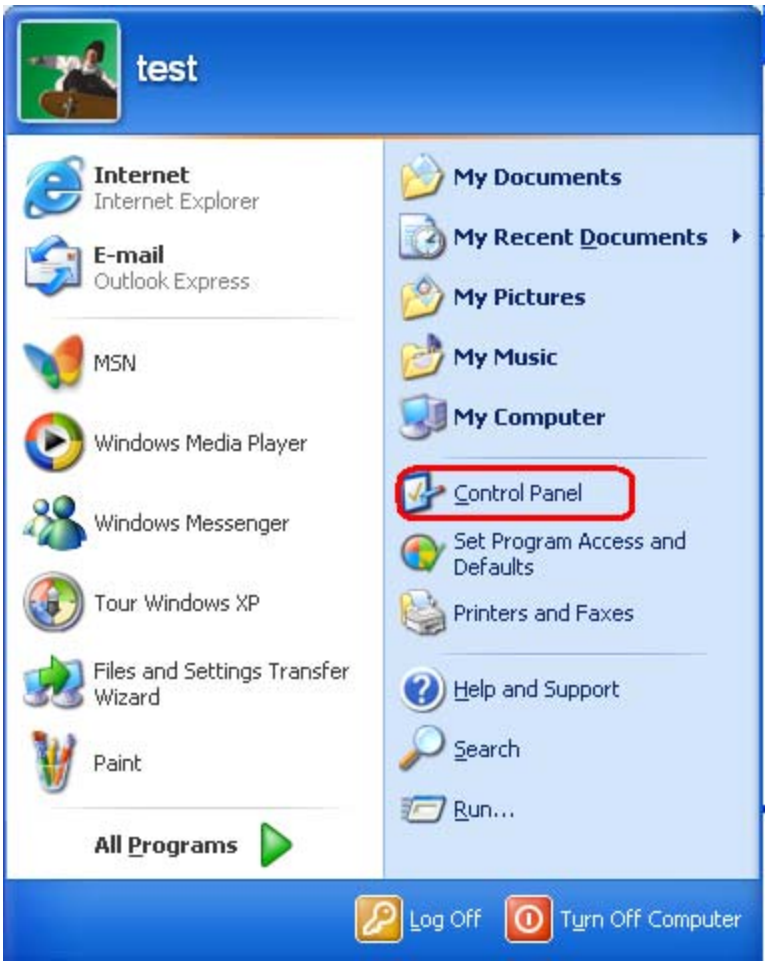


Figure 7-1: Access Windows Control Panel

Step 3: The Window in **Figure 7-2** appears.

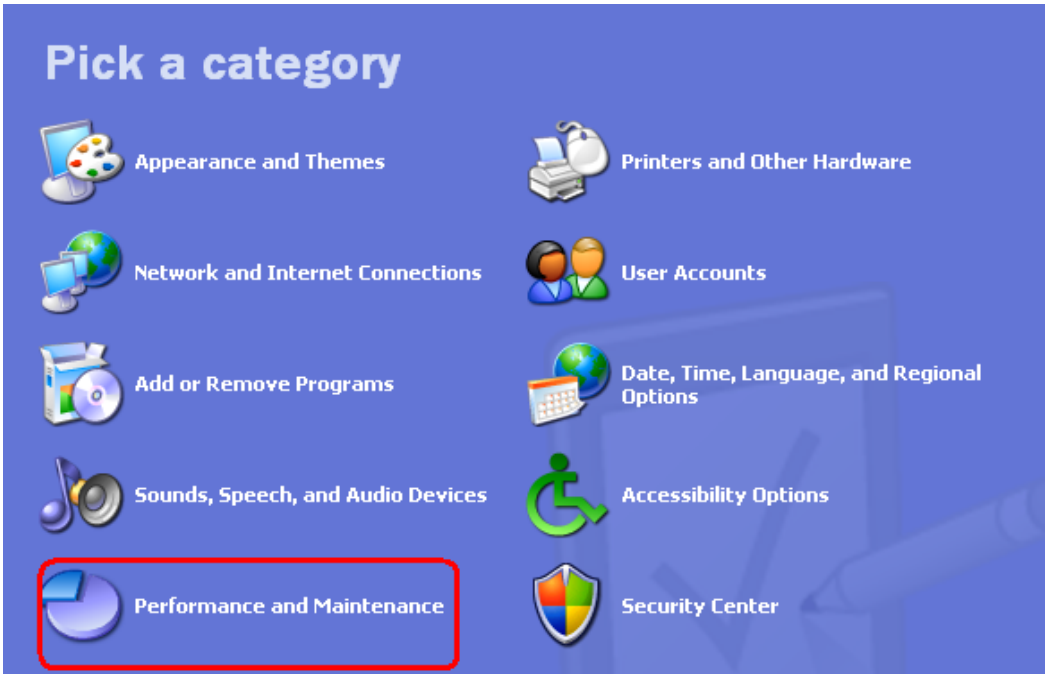


Figure 7-2: Performance and Maintenance

Step 4: Double click the **PERFORMANCE AND MAINTENANCE** option in **Figure 7-2**.

Step 5: The screen in **Figure 7-3** appears.

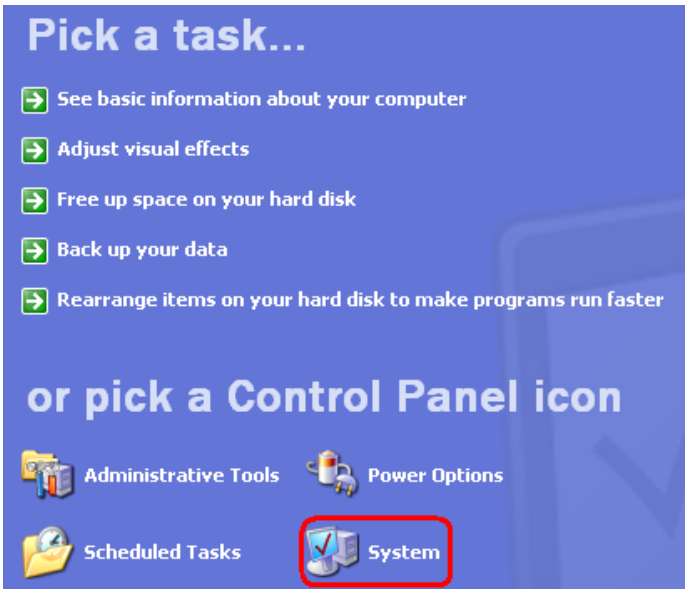

Pick a task...
See basic information about your computer
Adjust visual effects
Free up space on your hard disk
Back up your data
Rearrange items on your hard disk to make programs run faster
or pick a Control Panel icon
Administrative Tools
Power Options
Scheduled Tasks
System

Figure 7-3: Access the System

Step 6: Double click the **SYSTEM** option in **Figure 7-3**.

Step 7: The **SYSTEM PROPERTIES** screen in **Figure 7-4** appears.

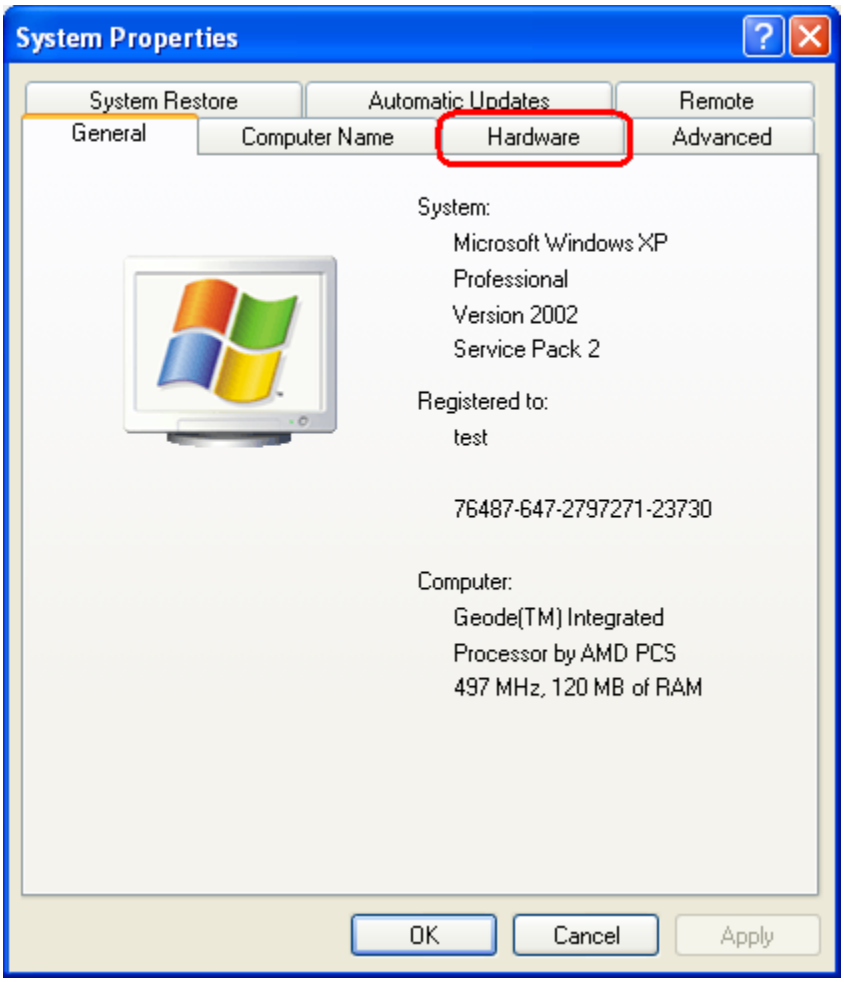


Figure 7-4: System Properties

Step 8: Double click the **HARDWARE** tab in the **Systems Property** window **Figure 7-4**.

Step 9: The screen in **Figure 7-5** appears.

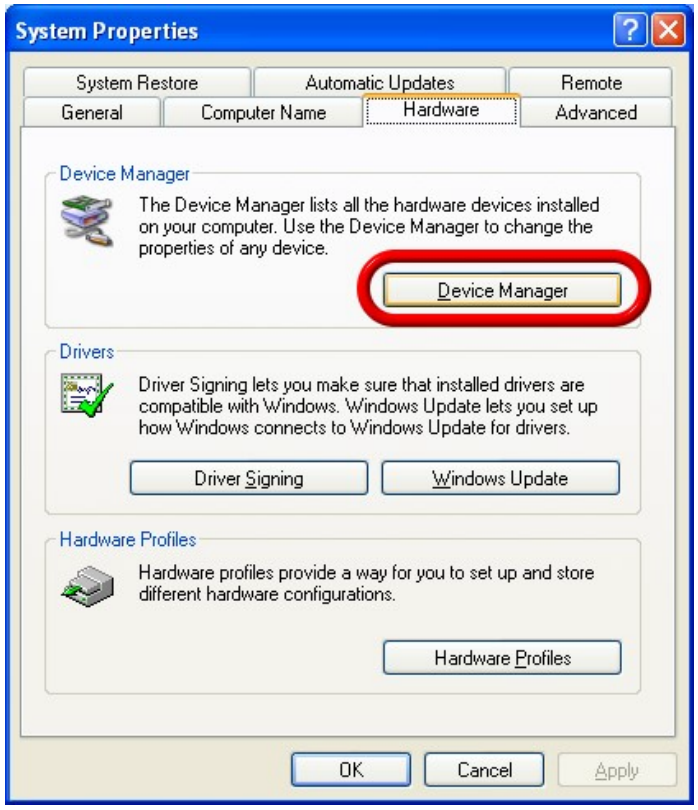

System Properties
System Restore
Automatic Updates
Remote
General
Computer Name
Hardware
Advanced
Device Manager
The Device Manager lists all the hardware devices installed on your computer. Use the Device Manager to change the properties of any device.
Device Manager
Drivers
Driver Signing lets you make sure that installed drivers are compatible with Windows. Windows Update lets you set up how Windows connects to Windows Update for drivers.
Driver Signing
Windows Update
Hardware Profiles
Hardware profiles provide a way for you to set up and store different hardware configurations.
Hardware Profiles
OK
Cancel
Apply

Figure 7-5: Open Device Manager

Step 10: Double click the **DEVICE MANAGER** tab in **Figure 7-5**.

Step 11: The **Device Manager** screen in **Figure 7-6** appears.

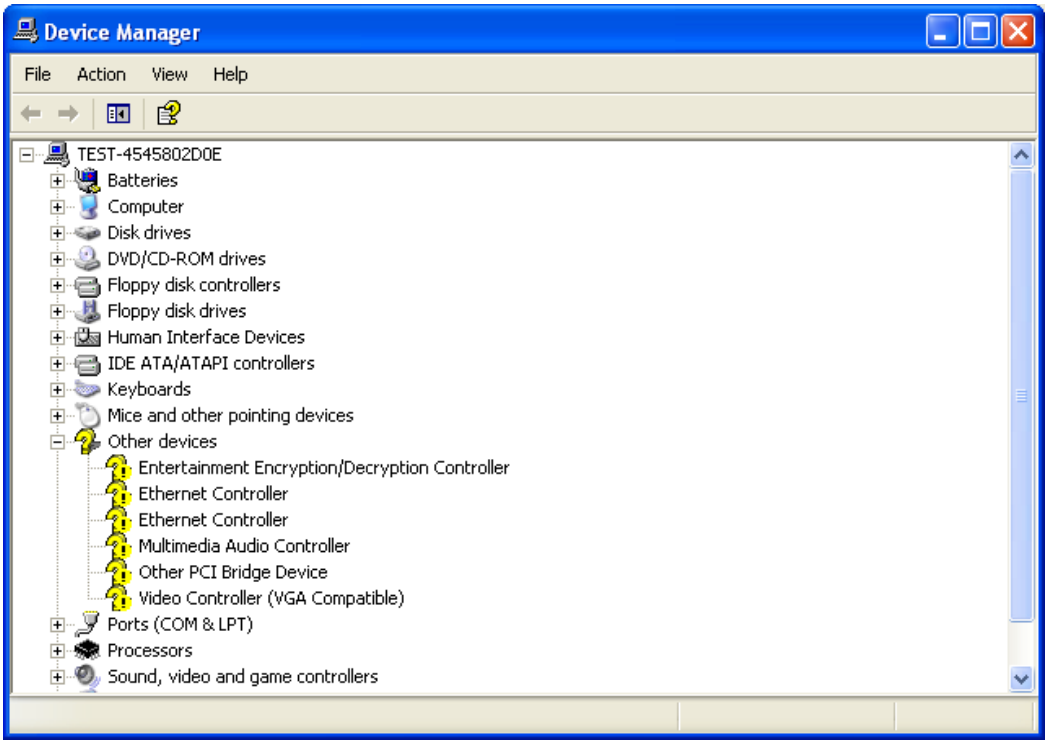


Figure 7-6: Device Manager

7.3 VGA Driver Installation

To install the VGA driver, please follow the instructions below.

Step 1: Open the **DEVICE MANAGER**. See **Section 7.2**.

Step 2: Right-click the **VGA CONTROLLER (VGA COMPATIBLE)** option listed under **OTHER DEVICES** in **Figure 7-7**.

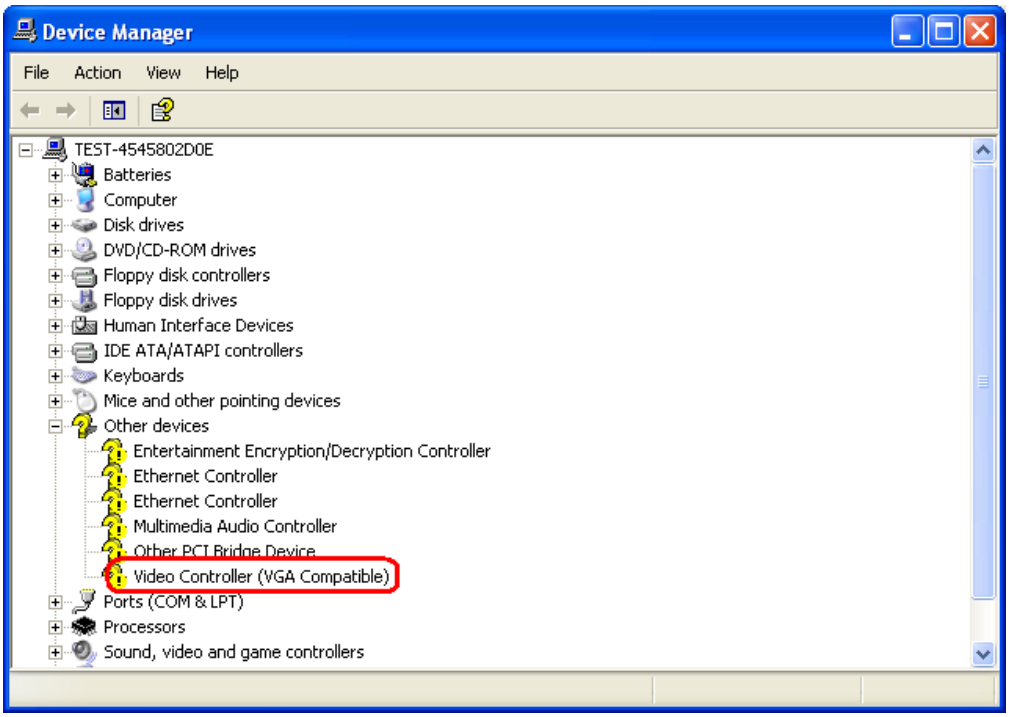


Figure 7-7: Video Controller (Device Manager)

Step 3: The small window in **Figure 7-8** appears.

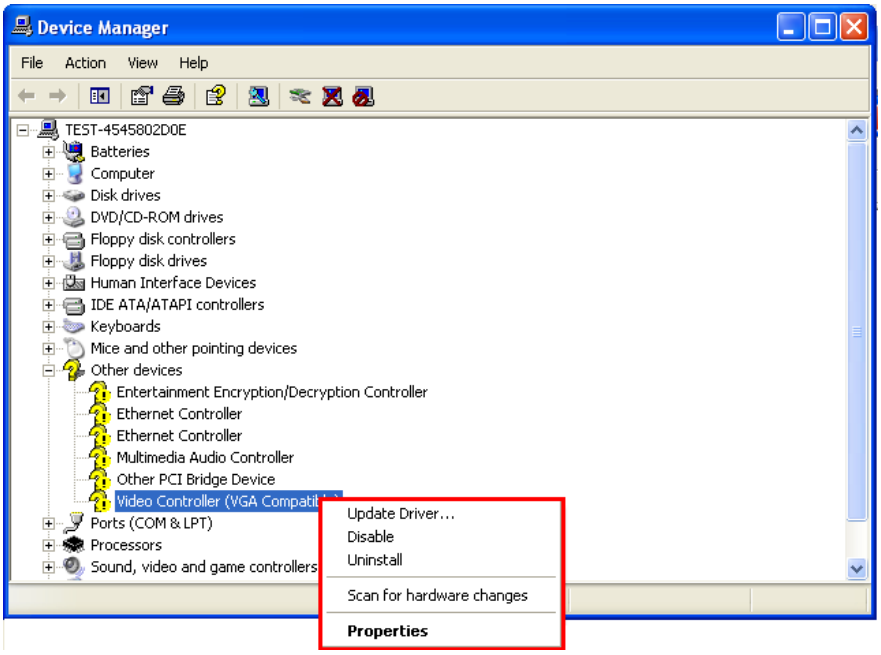


Figure 7-8: Update Driver Selection

Step 4: Select the **UPDATE DRIVER** option in the small window shown in **Figure 7-8**.

Step 5: The **HARDWARE UPDATE WIZARD** in **Figure 7-9** appears.

Hardware Update Wizard
Welcome to the Hardware Update Wizard
Windows will search for current and updated software by looking on your computer, on the hardware installation CD, or on the Windows Update Web site (with your permission).
Read our privacy policy
Can Windows connect to Windows Update to search for software?
Yes, this time only
Yes, now and every time I connect a device
No, not this time
Click Next to continue.
< Back
Next >
Cancel

Figure 7-9: Hardware Update Wizard

Step 6: Make sure the driver CD is in the disk.

Step 7: Select **NO, NOT THIS TIME** in **Figure 7-9** and click **NEXT**.

Step 8: The screen in **Figure 7-10** appears.

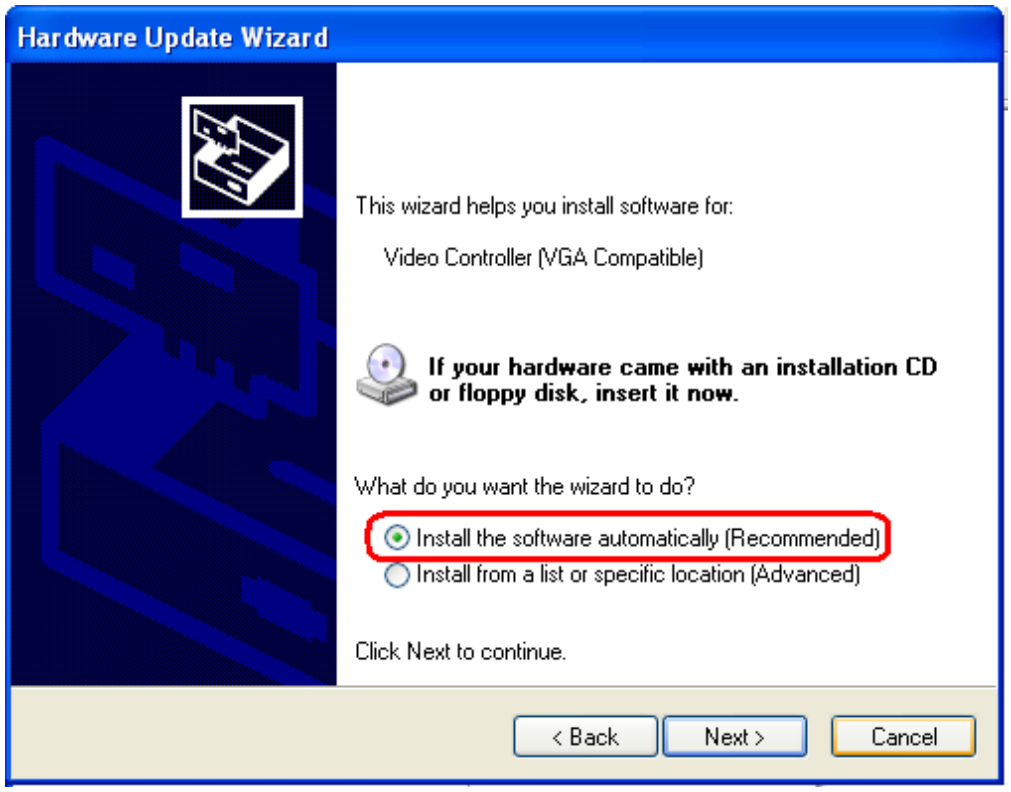

Hardware Update Wizard
This wizard helps you install software for:
Video Controller (VGA Compatible)
If your hardware came with an installation CD or floppy disk, insert it now.
What do you want the wizard to do?
Install the software automatically (Recommended)
Install from a list or specific location (Advanced)
Click Next to continue.
< Back
Next >
Cancel

Figure 7-10: VGA Driver Installation Start

Step 9: Select the recommended option in **Figure 7-10**.

Step 10: The Wizard then searches for the driver. See **Figure 7-11**.

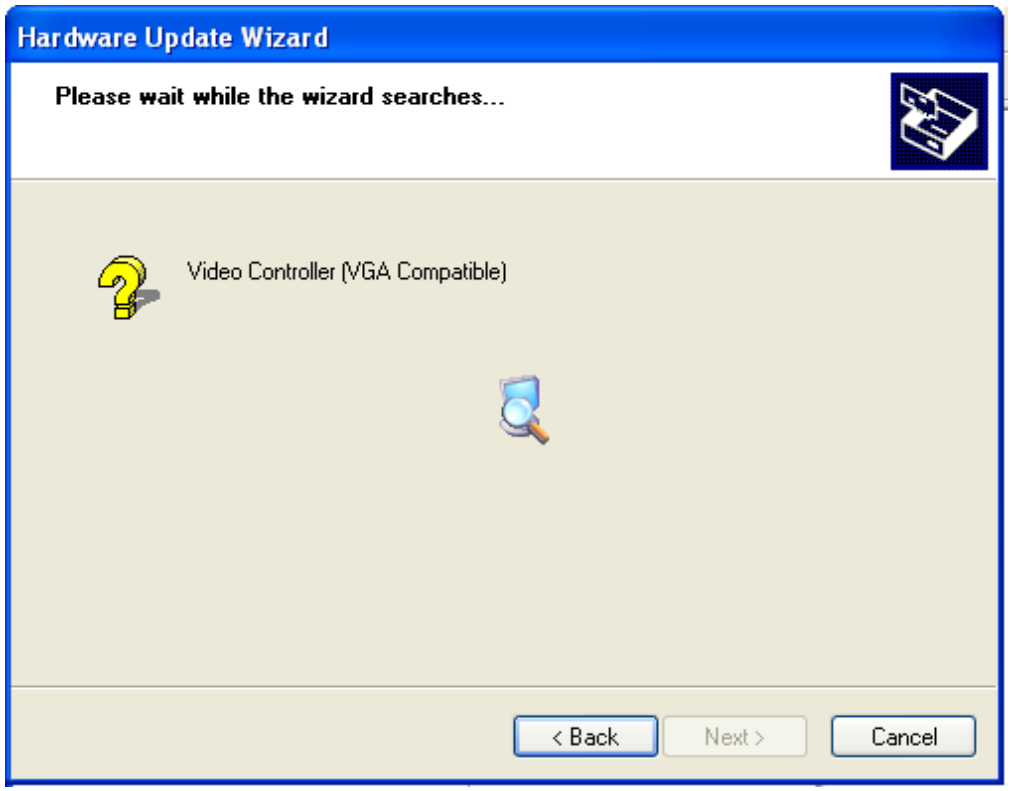


Figure 7-11: Wizard Search

Step 11: The warning screen in **Figure 7-12** appears.

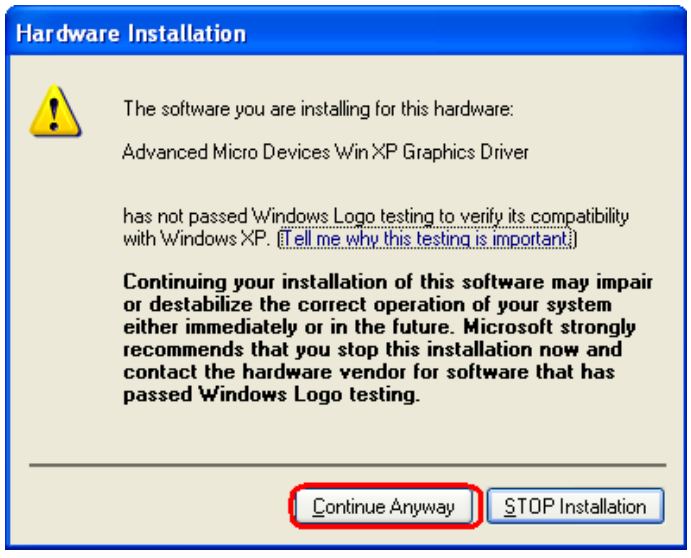

Hardware Installation
The software you are installing for this hardware:
Advanced Micro Devices Win XP Graphics Driver
has not passed Windows Logo testing to verify its compatibility with Windows XP. (Tell me why this testing is important.)
Continuing your installation of this software may impair or destabilize the correct operation of your system either immediately or in the future. Microsoft strongly recommends that you stop this installation now and contact the hardware vendor for software that has passed Windows Logo testing.
Continue Anyway
STOP Installation

Figure 7-12: Wizard Warning Screen

Step 12: Click the **Continue Anyway** tab.

Step 13: The Wizard updates the driver. See **Figure 7-13**.

CAUTION:

When the VGA driver is installed the system first sets a system restore point and backs up old files. This may take some time. Be patient and wait for the installation procedure to be completed.

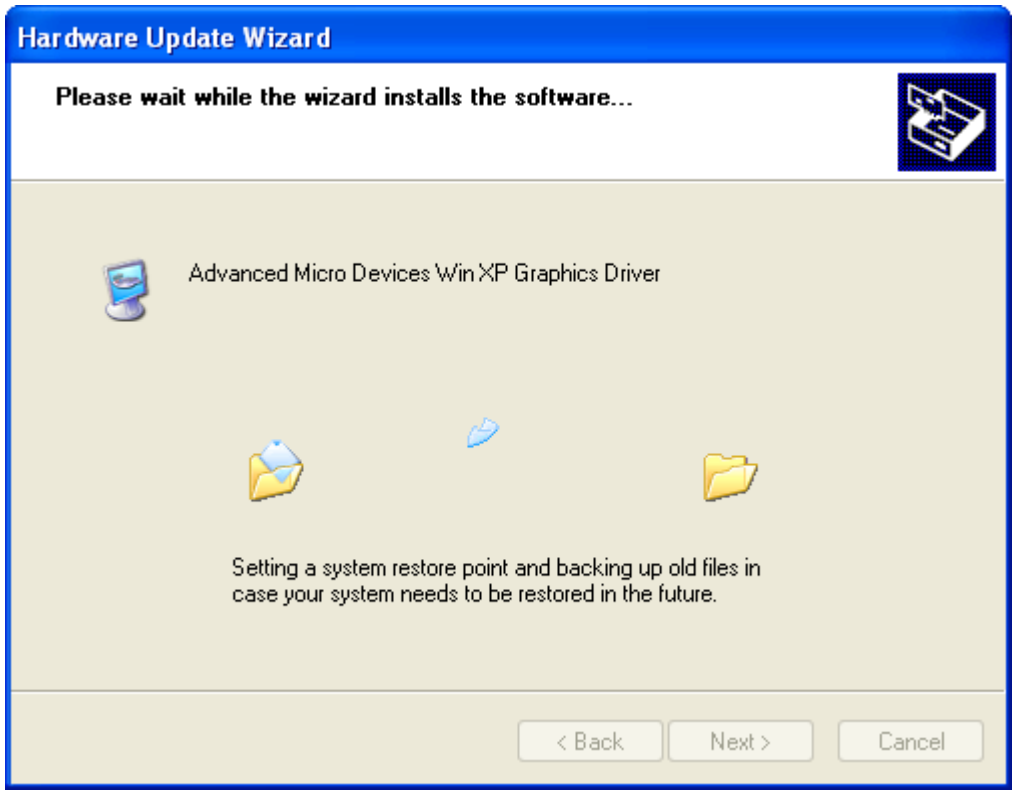

Hardware Update Wizard
Please wait while the wizard installs the software...
Advanced Micro Devices Win XP Graphics Driver
Setting a system restore point and backing up old files in case your system needs to be restored in the future.
< Back
Next >
Cancel

Figure 7-13: VGA Driver Installation

Step 14: When the driver is installed, the screen in **Figure 7-14** appears.

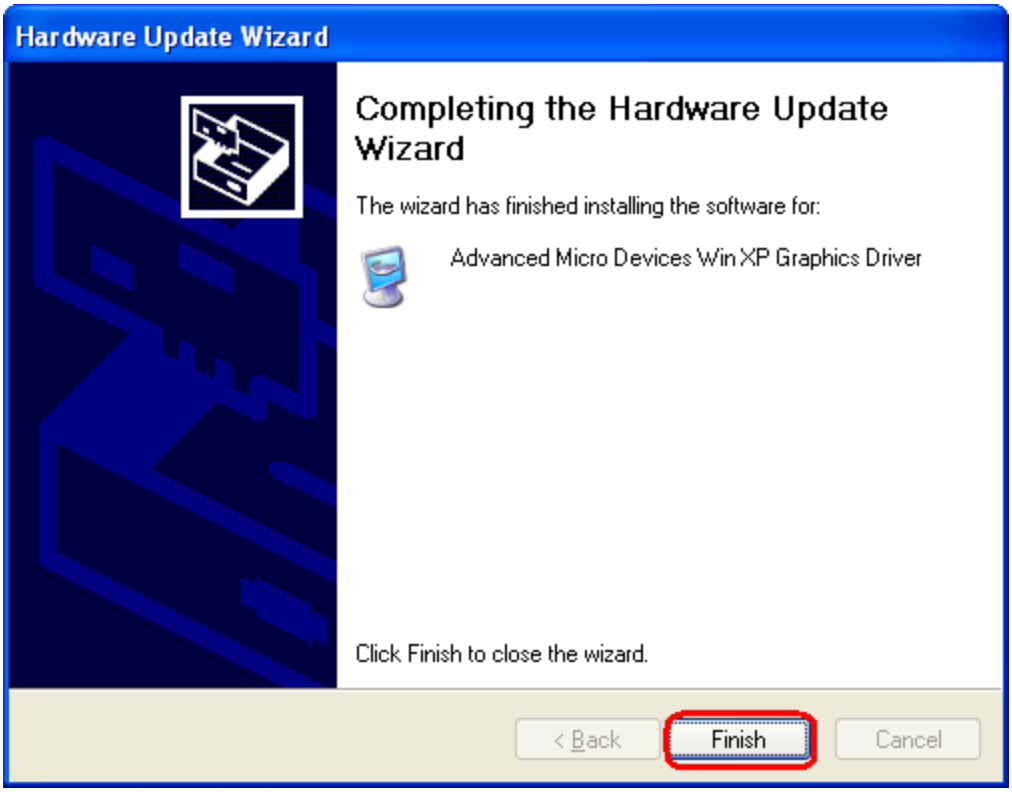

Hardware Update Wizard
Completing the Hardware Update Wizard
The wizard has finished installing the software for:
Advanced Micro Devices Win XP Graphics Driver
Click Finish to close the wizard.
< Back
Finish
Cancel

Figure 7-14: VGA Driver Installation Complete

Step 15: Click the Finish tab in to complete the **Figure 7-14** installation.

Step 16: The Device Manager refreshes and the Graphics Driver can be seen in the Display adapters option. See **Figure 7-15**.

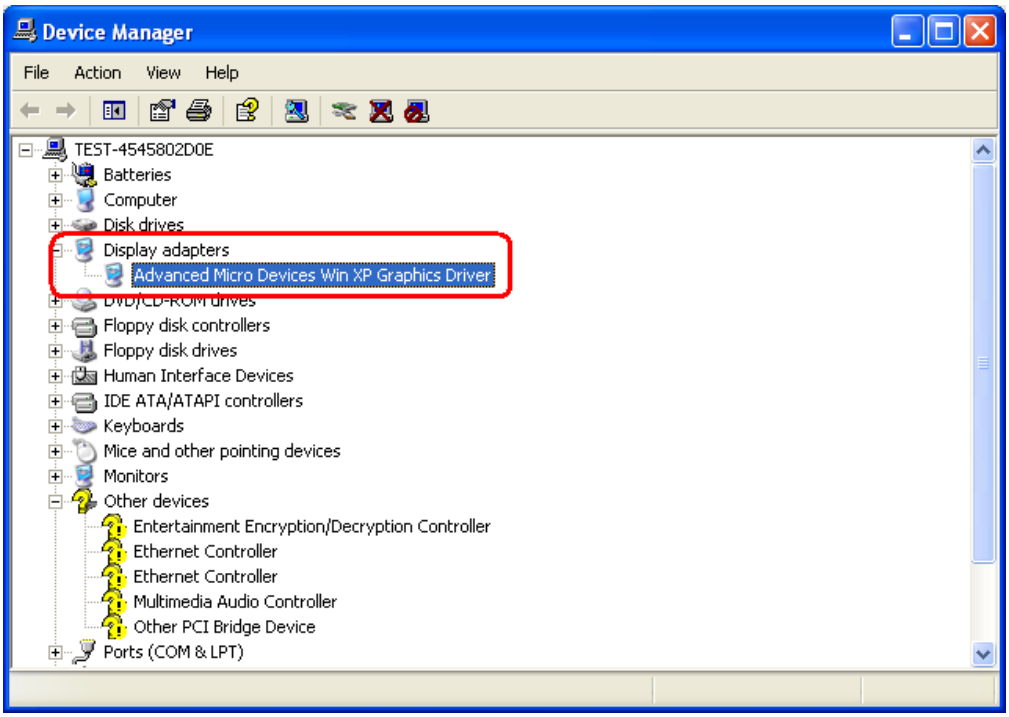


Figure 7-15: Device Manager Update

7.4 Audio Driver Installation

To install the Audio driver, please follow the instructions below.

Step 1: Open the **DEVICE MANAGER**. See **Section 7.2**.

Step 2: Right-click the **MULTIMEDIA AUDIO CONTROLLER** option listed under **OTHER DEVICES** in **Figure 7-16**.

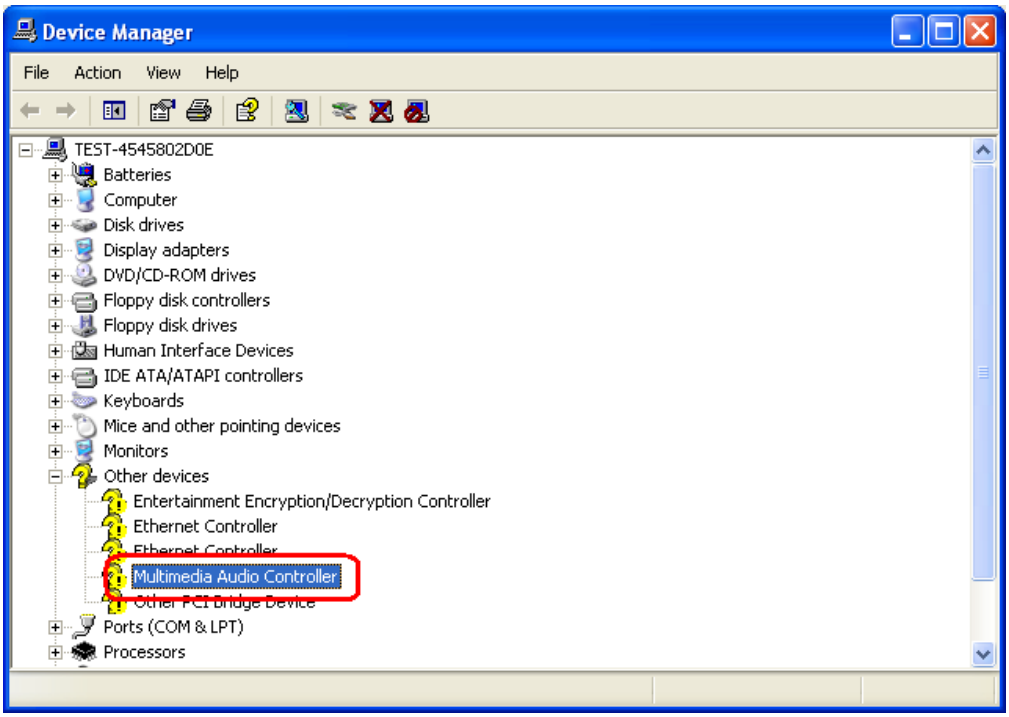


Figure 7-16: Audio Controller (Device Manager)

Step 3: The small window in **Figure 7-17** appears.

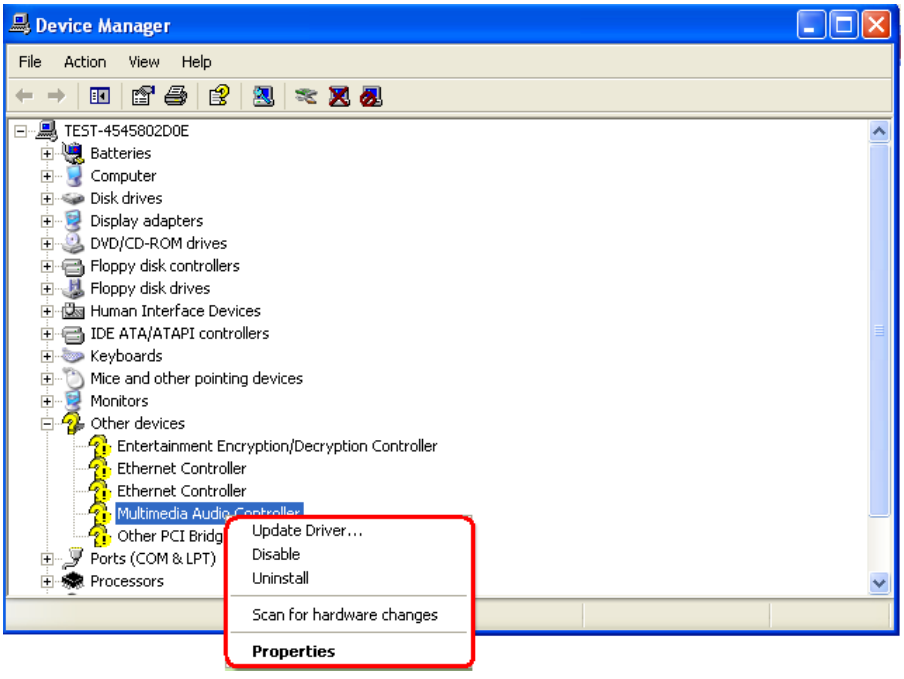


Figure 7-17: Update Audio Driver Selection

Step 4: Select the **UPDATE DRIVER** option in the small window shown in **Figure 7-17**.

Step 5: The **HARDWARE UPDATE WIZARD** in **Figure 7-18** appears.

Hardware Update Wizard
Welcome to the Hardware Update Wizard
Windows will search for current and updated software by looking on your computer, on the hardware installation CD, or on the Windows Update Web site (with your permission).
Read our privacy policy
Can Windows connect to Windows Update to search for software?
Yes, this time only
Yes, now and every time I connect a device
No, not this time
Click Next to continue.
< Back
Next >
Cancel

Figure 7-18: Hardware Update Wizard

Step 6: Make sure the driver CD is in the disk.

Step 7: Select **NO, NOT THIS TIME** in **Figure 7-18** and click **NEXT**.

Step 8: The screen in **Figure 7-19** appears.

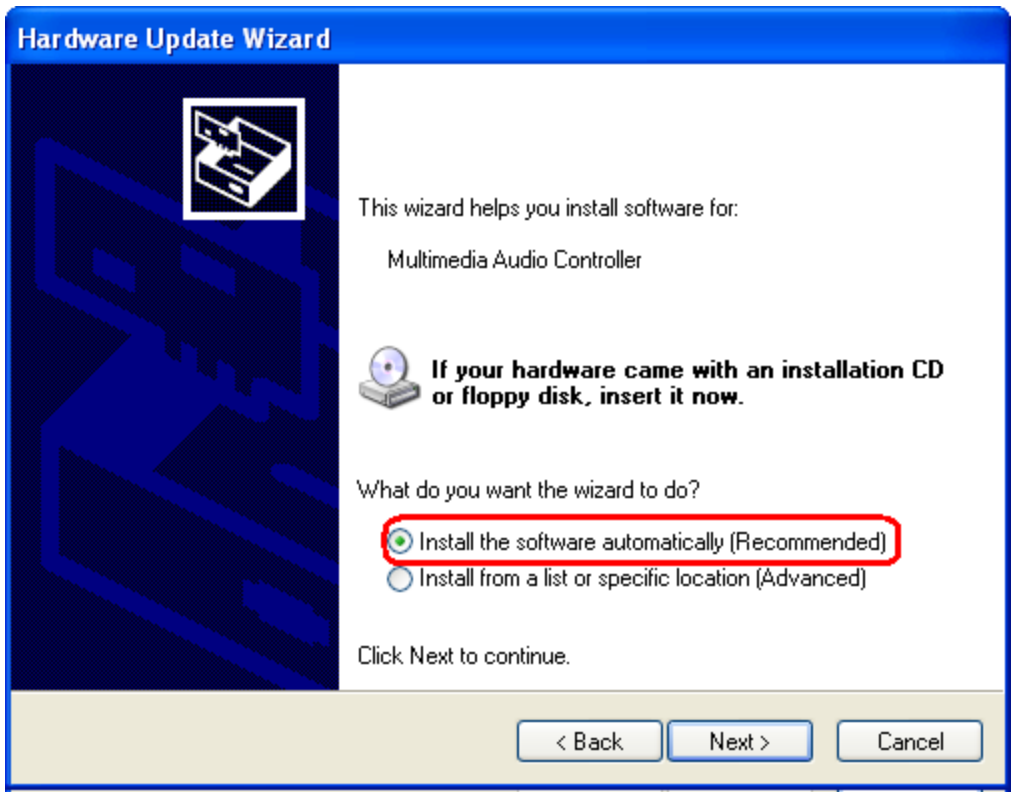

Hardware Update Wizard
This wizard helps you install software for:
Multimedia Audio Controller
If your hardware came with an installation CD or floppy disk, insert it now.
What do you want the wizard to do?
Install the software automatically (Recommended)
Install from a list or specific location (Advanced)
Click Next to continue.
< Back
Next >
Cancel

Figure 7-19: Audio Driver Installation Start

Step 9: Select the recommended option in **Figure 7-19**.

Step 10: The Wizard then searches for the driver. See **Figure 7-20**.

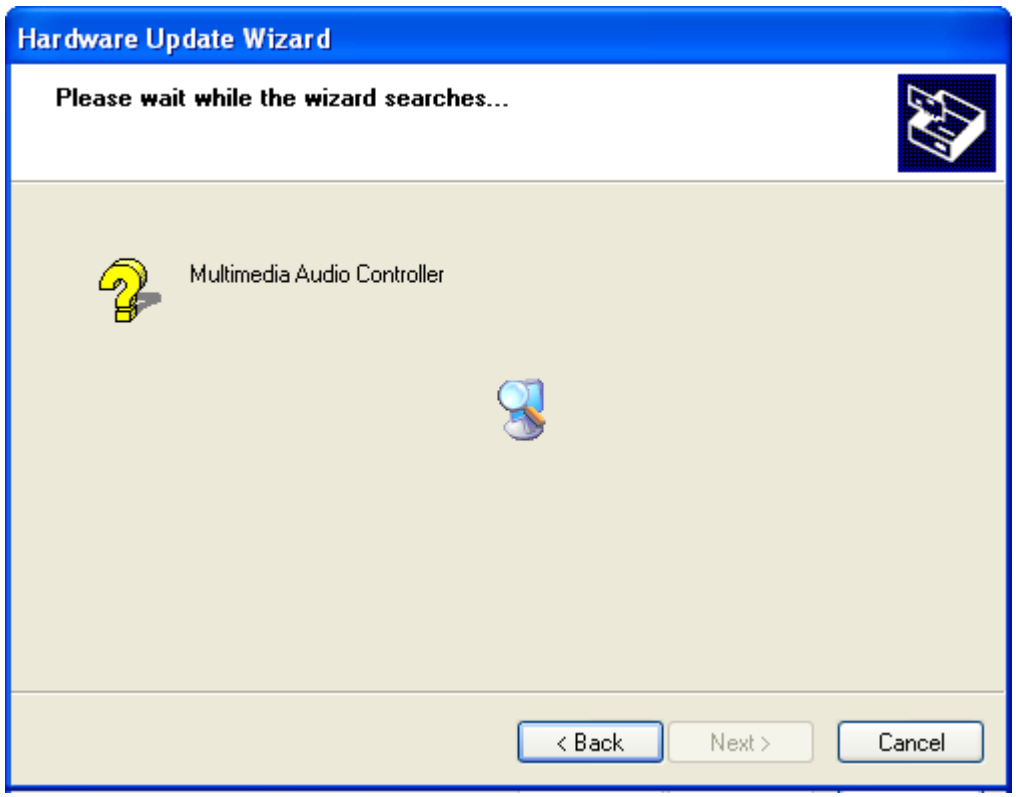


Figure 7-20: Wizard Search

Step 11: The warning screen in **Figure 7-21** appears.

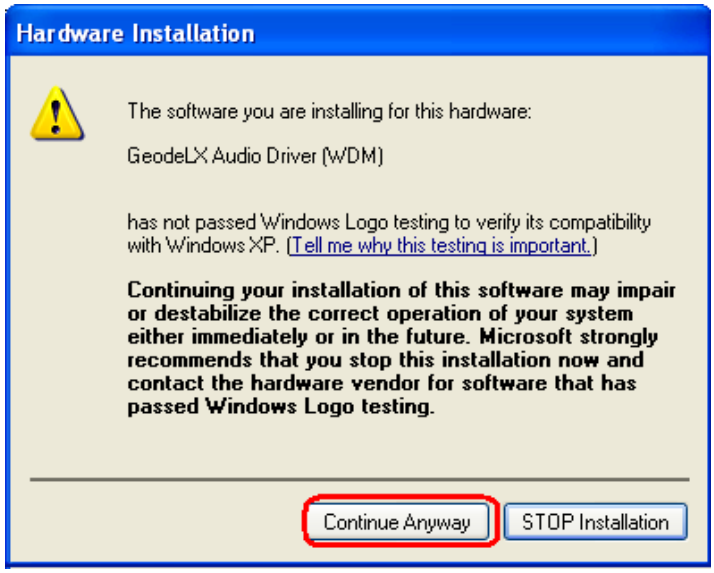

Hardware Installation
The software you are installing for this hardware:
GeodeLX Audio Driver (WDM)
has not passed Windows Logo testing to verify its compatibility with Windows XP. (Tell me why this testing is important.)
Continuing your installation of this software may impair or destabilize the correct operation of your system either immediately or in the future. Microsoft strongly recommends that you stop this installation now and contact the hardware vendor for software that has passed Windows Logo testing.
Continue Anyway
STOP Installation

Figure 7-21: Wizard Warning Screen

Step 12: Click the **Continue Anyway** tab.

Step 13: The Wizard updates the driver. See **Figure 7-22**.

CAUTION:

When the Audio driver is installed the system first sets a system restore point and backs up old files. This may take some time. Be patient and wait for the installation procedure to be completed.

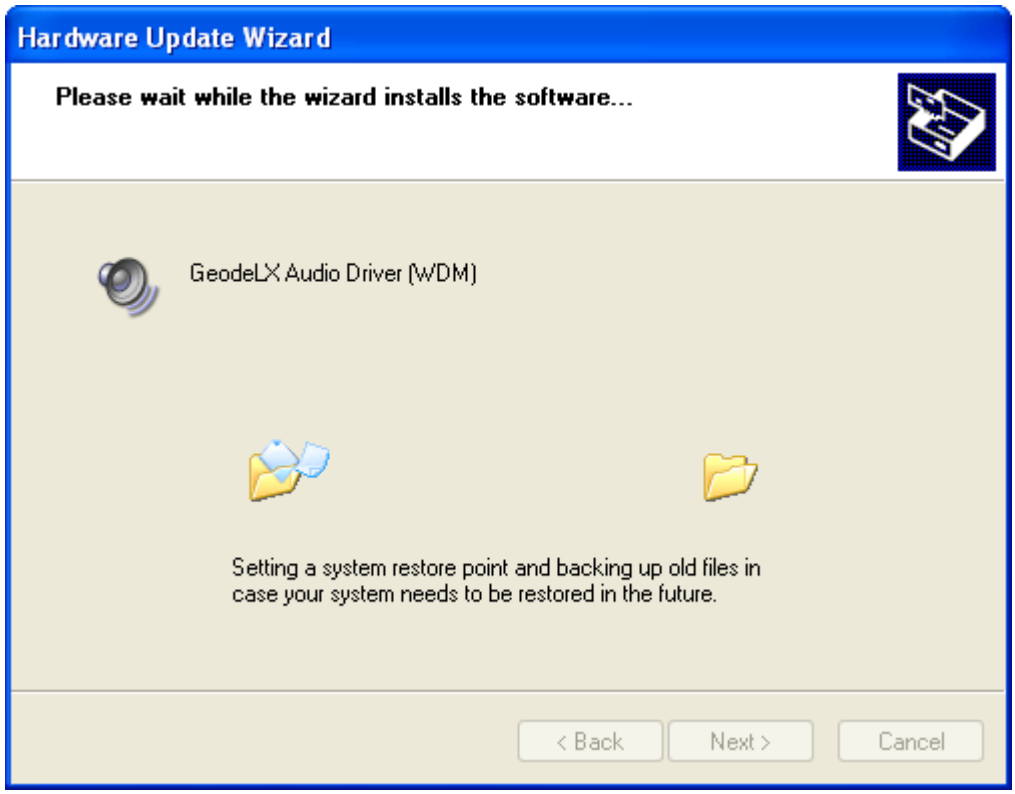

Hardware Update Wizard
Please wait while the wizard installs the software...
GeodeLX Audio Driver (WDM)
Setting a system restore point and backing up old files in case your system needs to be restored in the future.
< Back
Next >
Cancel

Figure 7-22: Audio Driver Installation

Step 14: When the driver is installed, the screen in **Figure 7-23** appears.

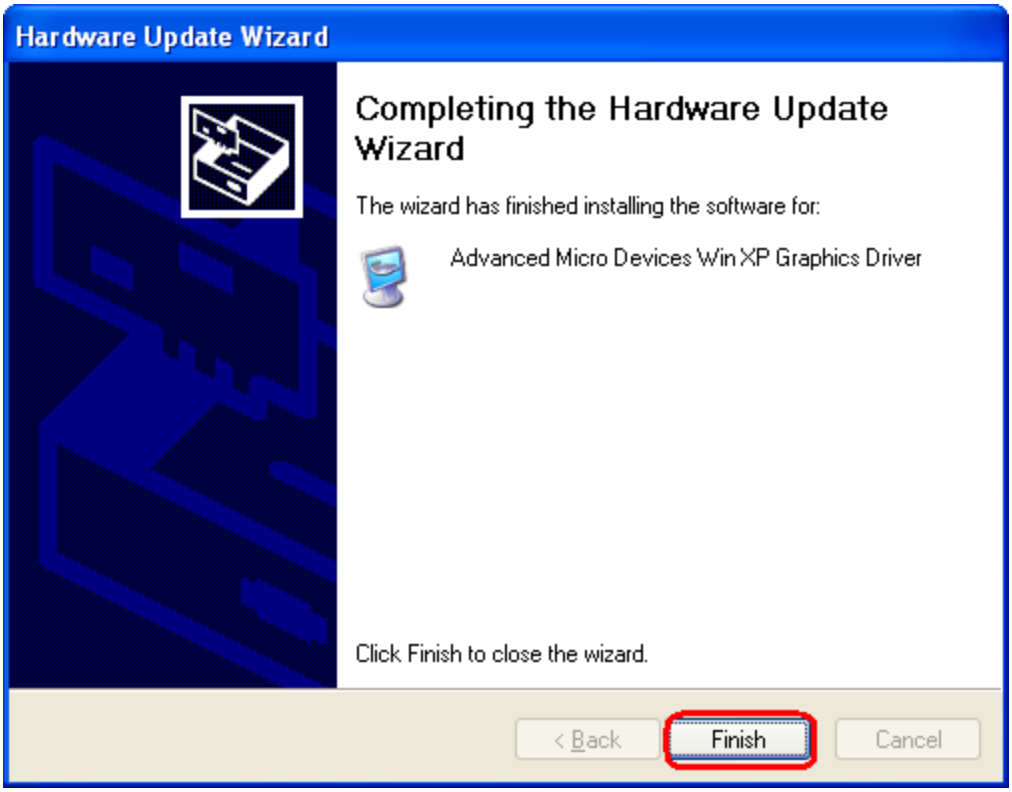

Hardware Update Wizard
Completing the Hardware Update Wizard
The wizard has finished installing the software for:
Advanced Micro Devices Win XP Graphics Driver
Click Finish to close the wizard.
< Back
Finish
Cancel

Figure 7-23: Audio Driver Installation Complete

Step 15: Click the Finish tab in to complete the **Figure 7-23** installation.

Step 16: The Device Manager refreshes and the Audio Driver can be seen in the Sound, Video and Game Controllers option. See **Figure 7-24**.

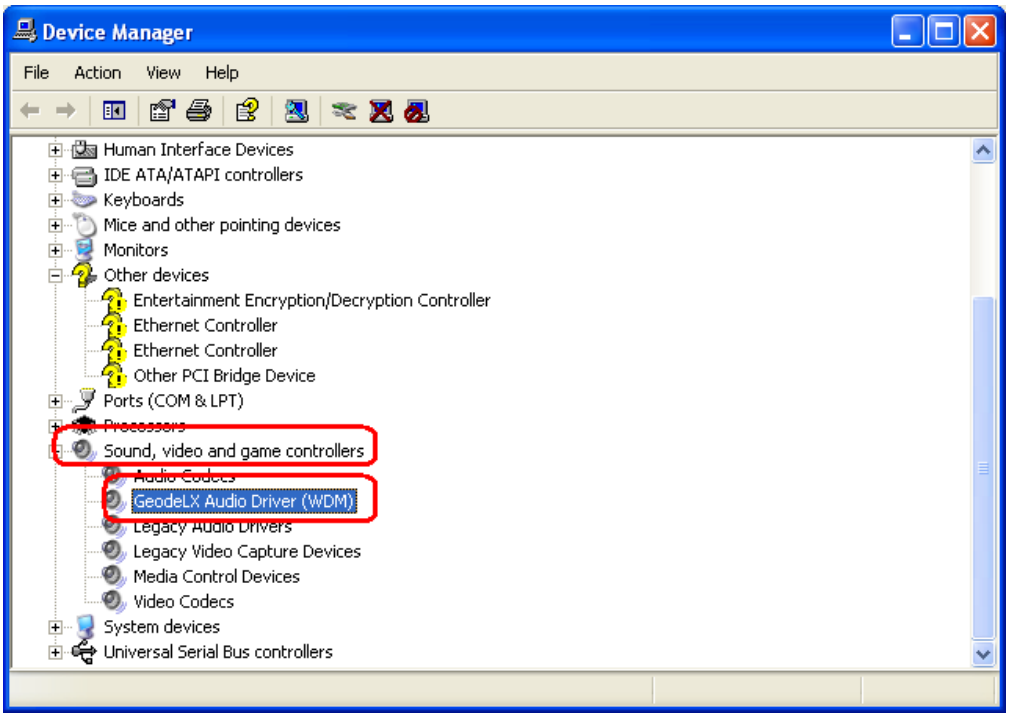


Figure 7-24: Device Manager Update

7.5 LAN Driver

To install the LAN driver, please follow the steps below.

Step 1: Click **LAN** from the **AMD LX/GX CD Driver Menu** to open a window to the **X:\LAN\Realtek** (where **X:** is the system CD drive) folder on the driver CD.

Step 2: Open the **RTL8100C** folder.

Step 3: Locate the **Setup** program icon (**Figure 7-25**).

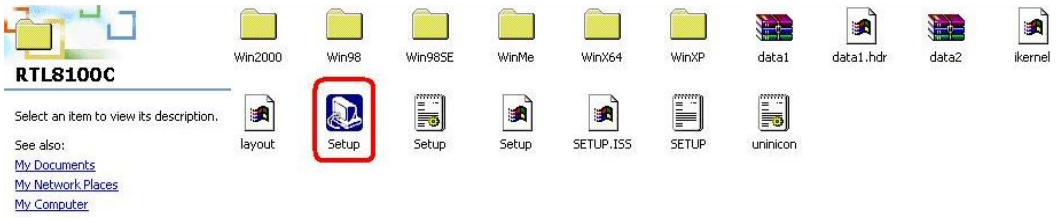


Figure 7-25: Locate the Setup Program Icon

Step 4: Double click the **Setup** program icon in **Figure 7-25**.

Step 5: The **Install Shield Wizard** is prepared to guide the user through the rest of the process (**Figure 7-26**).

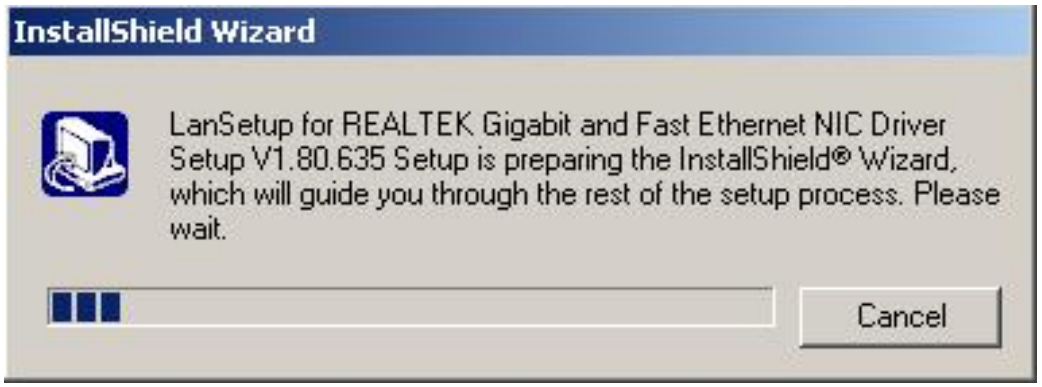

InstallShield Wizard
LanSetup for REALTEK Gigabit and Fast Ethernet NIC Driver Setup V1.80.635 Setup is preparing the InstallShield® Wizard, which will guide you through the rest of the setup process. Please wait.
Cancel

Figure 7-26: Preparing Setup Screen

Step 6: Once initialized, the **Install Wizard** welcome screen appears (**Figure 7-27**).

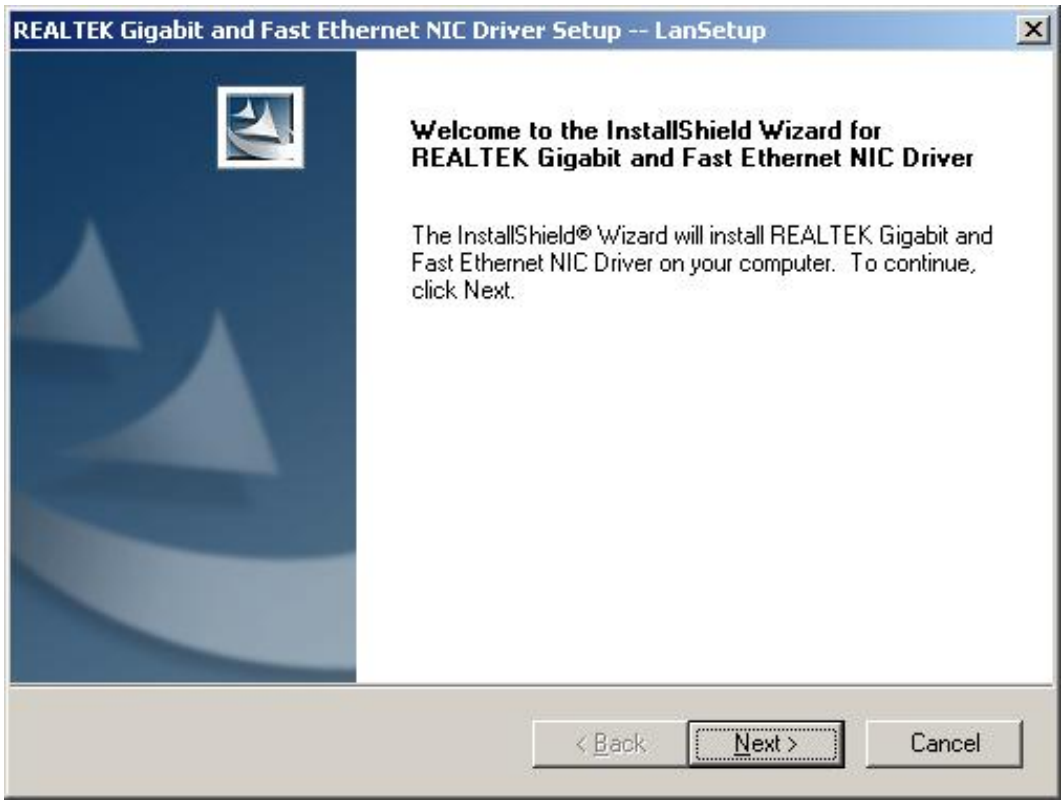

REALTEK Gigabit and Fast Ethernet NIC Driver Setup -- LanSetup
Welcome to the InstallShield Wizard for REALTEK Gigabit and Fast Ethernet NIC Driver
The InstallShield® Wizard will install REALTEK Gigabit and Fast Ethernet NIC Driver on your computer. To continue, click Next.
< Back
Next >
Cancel

Figure 7-27: Install Wizard Welcome Screen

Step 7: Click **NEXT** to continue the installation or **CANCEL** to stop the installation.

Step 8: The **Install Wizard** starts to install the LAN driver.

Step 9: Once the installation is complete, the **InstallShield Wizard Complete** screen appears (**Figure 7-28**).

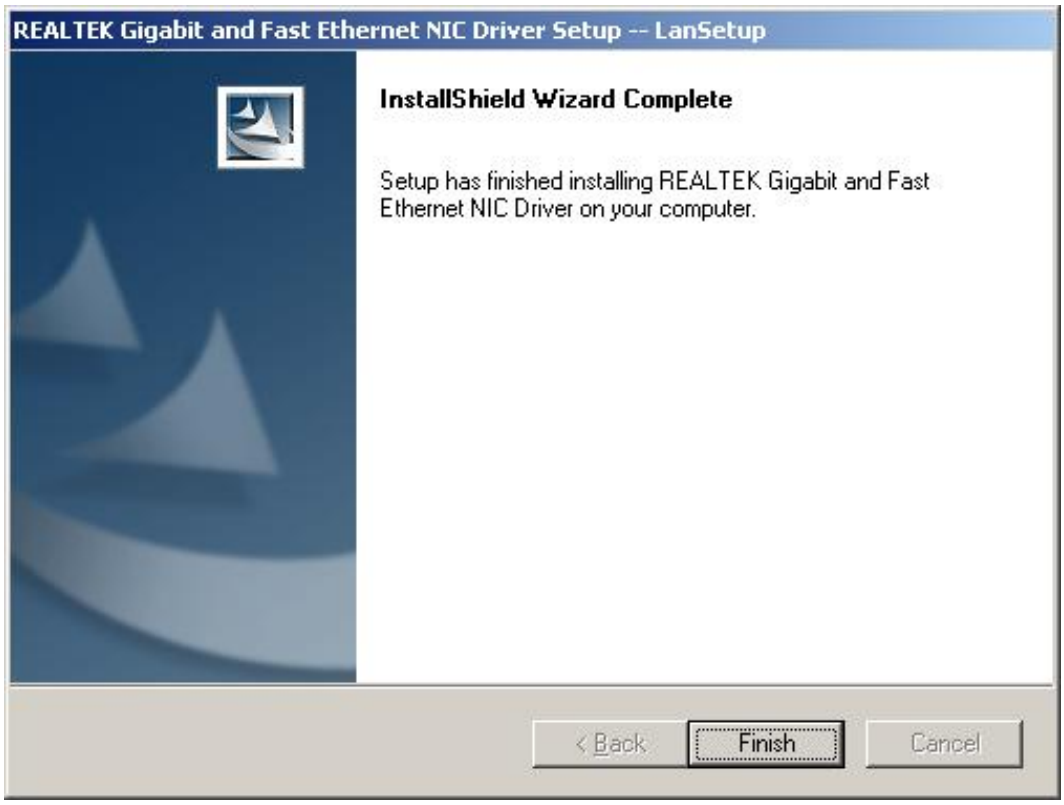

REALTEK Gigabit and Fast Ethernet NIC Driver Setup -- LanSetup
InstallShield Wizard Complete
Setup has finished installing REALTEK Gigabit and Fast Ethernet NIC Driver on your computer.
< Back
Finish
Cancel

Figure 7-28: Installing Screen

Step 10: Click **FINISH** to complete the installation and exit the **Install Shield Wizard**.

Step 11: Once the installation process is complete, the computer may be restarted immediately or later. Select the preferred option and click **FINISH** to complete the installation process and exit the **Install Shield Wizard**.

Appendix

A

BIOS Options

The following is a list of the BIOS options that are available on this board.

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Appendix

B

Terminology

AC ’97	Audio Codec 97 (AC’97) refers to a codec standard developed by Intel® in 1997.
ACPI	Advanced Configuration and Power Interface (ACPI) is an OS-directed configuration, power management, and thermal management interface.
AHCI	Advanced Host Controller Interface (AHCI) is a SATA Host controller register-level interface.
APM	The Advanced Power Management (APM) application program interface (API) enables the inclusion of power management in the BIOS.
ARMD	An ATAPI Removable Media Device (ARMD) is any ATAPI device that supports removable media, besides CD and DVD drives.
ASKIR	Amplitude Shift Keyed Infrared (ASKIR) is a form of modulation that represents a digital signal by varying the amplitude (“volume”) of the signal. A low amplitude signal represents a binary 0, while a high amplitude signal represents a binary 1.
BIOS	The Basic Input/Output System (BIOS) is firmware that is first run when the computer is turned on and can be configured by the end user
CODEC	The Compressor-Decompressor (CODEC) encodes and decodes digital audio data on the system.
CMOS	Complimentary metal-oxide-conductor is an integrated circuit used in chips like static RAM and microprocessors.
COM	COM refers to serial ports. Serial ports offer serial communication to expansion devices. The serial port on a personal computer is usually a male DB-9 connector.
DAC	The Digital-to-Analog Converter (DAC) converts digital signals to analog signals.

DDR	Double Data Rate refers to a data bus transferring data on both the rising and falling edges of the clock signal.
DMA	Direct Memory Access (DMA) enables some peripheral devices to bypass the system processor and communicate directly with the system memory.
DIMM	Dual Inline Memory Modules are a type of RAM that offer a 64-bit data bus and have separate electrical contacts on each side of the module.
DIO	The digital inputs and digital outputs are general control signals that control the on/off circuit of external devices or TTL devices. Data can be read or written to the selected address to enable the DIO functions.
EHCI	The Enhanced Host Controller Interface (EHCI) specification is a register-level interface description for USB 2.0 Host Controllers.
EIDE	Enhanced IDE (EIDE) is a newer IDE interface standard that has data transfer rates between 4.0 MBps and 16.6 MBps.
EIST	Enhanced Intel® SpeedStep Technology (EIST) allows users to modify the power consumption levels and processor performance through application software. The application software changes the bus-to-core frequency ratio and the processor core voltage.
FSB	The Front Side Bus (FSB) is the bi-directional communication channel between the processor and the Northbridge chipset.
GbE	Gigabit Ethernet (GbE) is an Ethernet version that transfers data at 1.0 Gbps and complies with the IEEE 802.3-2005 standard.
GPIO	General purpose input
HDD	Hard disk drive (HDD) is a type of magnetic, non-volatile computer storage device that stores digitally encoded data.
ICH	The Input/Ouput Controll Hub (ICH) is an Intel® Southbridge chipset.

IrDA	Infrared Data Association (IrDA) specify infrared data transmission protocols used to enable electronic devices to wirelessly communicate with each other.
L1 Cache	The Level 1 Cache (L1 Cache) is a small memory cache built into the system processor.
L2 Cache	The Level 2 Cache (L2 Cache) is an external processor memory cache.
LCD	Liquid crystal display (LCD) is a flat, low-power display device that consists of two polarizing plates with a liquid crystal panel in between.
LVDS	Low-voltage differential signaling (LVDS) is a dual-wire, high-speed differential electrical signaling system commonly used to connect LCD displays to a computer.
MAC	The Media Access Control (MAC) protocol enables several terminals or network nodes to communicate in a LAN, or other multipoint networks.
PCIe	PCI Express (PCIe) is a communications bus that uses dual data lines for full-duplex (two-way) serial (point-to-point) communications between the SBC components and/or expansion cards and the SBC chipsets. Each line has a 2.5 Gbps data transmission rate and a 250 MBps sustained data transfer rate.
POST	The Power-on Self Test (POST) is the pre-boot actions the system performs when the system is turned-on.
QVGA	Quarter Video Graphics Array (QVGA) refers to a display with a resolution of 320 x 240 pixels.
RAID	Redundant Array of Inexpensive Disks (RAID) refers to redundantly backing up data on multiple disks to ensure that if one disk fails, the data is not lost and can be restored from the remaining disks in the array.
RAM	Random Access Memory (RAM) is volatile memory that loses data

	when power is lost. RAM has very fast data transfer rates compared to other storage like hard drives.
SATA	Serial ATA (SATA) is a serial communications bus designed for data transfers between storage devices and the computer chipsets. The SATA bus has transfer speeds up to 1.5 Gbps and the SATA II bus has data transfer speeds of up to 3.0 Gbps.
S.M.A.R.T	Self Monitoring Analysis and Reporting Technology (S.M.A.R.T) refers to automatic status checking technology implemented on hard disk drives.
UART	Universal Asynchronous Receiver-transmitter (UART) is responsible for asynchronous communications on the system and manages the system’s serial communication (COM) ports.
UHCI	The Universal Host Controller Interface (UHCI) specification is a register-level interface description for USB 1.1 Host Controllers.
USB	The Universal Serial Bus (USB) is an external bus standard for interfacing devices. USB 1.1 supports 12Mbps data transfer rates, while USB 2.0 supports 480Mbps data transfer rates.
VGA	The Video Graphics Array (VGA) is a graphics display system developed by IBM.

Appendix

C

DIO Interface

C.1 DIO Interface Introduction

The DIO connector on the NOVA-LX is interfaced to GIO ports on the Winbond chipset. The DIO has both 4-bit digital inputs and 4-bit digital outputs. The digital inputs and digital outputs are generally control signals that control the on/off circuit of external devices or TTL devices. Data can be read or written to the selected address to enable the DIO functions.

NOTE:

For further information, please refer to the datasheet for the Winbond Super I/O chipset.

C.2 DIO Connector Pinouts

The following table describes how the DIO connector pins are connected to the Super I/O GPIO port 1.

Pin No.	Pin Signal	Super I/O Pin No.	Symbol	Description
1	GND	--	--	--
2	VCC	--	--	--
3	Output 0	124	GP14	GPIO Port 1 Bit 4
4	Output 1	123	GP15	GPIO Port 1 Bit 5
5	Output 2	122	GP16	GPIO Port 1 Bit 6
6	Output 3	121	GP17	GPIO Port 1 Bit 7
7	Input 0	125	GP13	GPIO Port 1 Bit 3
8	Input 1	126	GP12	GPIO Port 1 Bit 2
9	Input 2	127	GP11	GPIO Port 1 Bit 1
10	Input 3	128	GP10	GPIO Port 1 Bit 0

C.3 Assembly Language Samples

C.3.1 Enable the DIO Input Function

The BIOS interrupt call INT 15H controls the digital I/O. An assembly program to enable digital I/O input functions is listed below.

```
MOV     AX, 6F08H     Sets the digital port as input
INT     15H           Initiates the INT 15H BIOS call
```

C.3.2 Enable the DIO Output Function

The BIOS interrupt call INT 15H controls the digital I/O. An assembly program to enable digital I/O output functions is listed below.

```
MOV     AX, 6F09H     Sets the digital port as output
MOV     BL, 09H
INT     15H           Initiates the INT 15H BIOS call
```

Appendix

D

Watchdog Timer

NOTE:

The following discussion applies to DOS environment. IEI support is contacted or the IEI website visited for specific drivers for more sophisticated operating systems, e.g., Windows and Linux.

The Watchdog Timer is provided to ensure that standalone systems can always recover from catastrophic conditions that cause the CPU to crash. This condition may have occurred by external EMI or a software bug. When the CPU stops working correctly, Watchdog Timer either performs a hardware reset (cold boot) or a Non-Maskable Interrupt (NMI) to bring the system back to a known state.

A BIOS function call (INT 15H) is used to control the Watchdog Timer:

INT 15H:

AH – 6FH Sub-function:	
AL – 2:	Sets the Watchdog Timer’s period.
BL:	Time-out value (Its unit-second is dependent on the item “Watchdog Timer unit select” in CMOS setup).

Table D-1: AH-6FH Sub-function

Call sub-function 2 to set the time-out period of Watchdog Timer first. If the time-out value is not zero, the Watchdog Timer starts counting down. While the timer value reaches zero, the system resets. To ensure that this reset condition does not occur, calling sub-function 2 must periodically refresh the Watchdog Timer. However, the Watchdog timer is disabled if the time-out value is set to zero.

A tolerance of at least 10% must be maintained to avoid unknown routines within the operating system (DOS), such as disk I/O that can be very time-consuming.

NOTE:

When exiting a program it is necessary to disable the Watchdog Timer, otherwise the system resets.

Example program:

```
; INITIAL TIMER PERIOD COUNTER
;
W_LOOP:

        MOV     AX, 6F02H       ;setting the time-out value
        MOV     BL, 30          ;time-out value is 48 seconds
        INT      15H
 ;
; ADD THE APPLICATION PROGRAM HERE
;
        CMP      EXIT_AP, 1     ;is the application over?
        JNE      W_LOOP         ;No, restart the application

        MOV     AX, 6F02H       ;disable Watchdog Timer
        MOV     BL, 0           ;
        INT      15H
;
; EXIT ;
```

Appendix

E

Address Mapping

E.1 Address Map

I/O address Range	Description
000-01F	DMA Controller
020-021	Interrupt Controller
040-043	System time
060-06F	Keyboard Controller
070-07F	System CMOS/Real time Clock
080-09F	DMA Controller
0A0-0A1	Interrupt Controller
0C0-0DF	DMA Controller
0F0-0FF	Numeric data processor
1F0-1F7	Primary IDE Channel
2F8-2FF	Serial Port 2 (COM2)
378-37F	Parallel Printer Port 1 (LPT1)
3B0-3BB	Intel Graphics Controller
3C0-3DF	Intel Graphics Controller
3F6-3F6	Primary IDE Channel
3F7-3F7	Standard floppy disk controller
3F8-3FF	Serial Port 1 (COM1)

Table E-1: IO Address Map

E.2 1st MB Memory Address Map

Memory address	Description
00000-9FFFF	System memory
A0000-BFFFF	VGA buffer
F0000-FFFFF	System BIOS
1000000-	Extend BIOS

Table E-2: 1st MB Memory Address Map

E.3 IRQ Mapping Table

IRQ0	System Timer	IRQ8	RTC clock
IRQ1	Keyboard	IRQ9	ACPI
IRQ2	Available	IRQ10	LAN
IRQ3	COM2	IRQ11	LAN/USB2.0/SATA
IRQ4	COM1	IRQ12	PS/2 mouse
IRQ5	SMBus Controller	IRQ13	FPU
IRQ6	FDC	IRQ14	Primary IDE
IRQ7	Available	IRQ15	Secondary IDE

Table E-3: IRQ Mapping Table

E.4 DMA Channel Assignments

Channel	Function
0	Available
1	Available
2	Floppy disk (8-bit transfer)
3	Available
4	Cascade for DMA controller 1
5	Available
6	Available
7	Available

Table E-4: IRQ Mapping Table

Appendix

F

Compatibility

NOTE:

The compatible items described here have been tested by the IEI R&D team and found to be compatible with the NOVA-LX

F.1 Compatible Operating Systems

The following operating systems have been successfully run on the NOVA-LX.

- Windows 2000 with Service Pack 4
- Windows XP with Service Pack 2
- Windows Vista Business (32-bit)
- Fedora Core 7

Appendix

G

Hazardous Materials Disclosure

G.1 Hazardous Material Disclosure Table for IPB Products Certified as RoHS Compliant Under 2002/95/EC Without Mercury

The details provided in this appendix are to ensure that the product is compliant with the Peoples Republic of China (China) RoHS standards. The table below acknowledges the presences of small quantities of certain materials in the product, and is applicable to China RoHS only.

A label will be placed on each product to indicate the estimated “Environmentally Friendly Use Period” (EFUP). This is an estimate of the number of years that these substances would “not leak out or undergo abrupt change.” This product may contain replaceable sub-assemblies/components which have a shorter EFUP such as batteries and lamps. These components will be separately marked.

Please refer to the table on the next page.

Part Name	Toxic or Hazardous Substances and Elements					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (CR(VI))	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)
Housing	x	O	O	O	O	x
Display	X	O	O	O	O	X
Printed Circuit Board	X	O	O	O	O	X
Metal Fasteners	X	O	O	O	O	O
Cable Assembly	X	O	O	O	O	X
Fan Assembly	X	O	O	O	O	X
Power Supply Assemblies	X	O	O	O	O	X
Battery	O	O	O	O	O	O

O: This toxic or hazardous substance is contained in all of the homogeneous materials for the part is below the limit requirement in SJ/T11363-2006

X: This toxic or hazardous substance is contained in at least one of the homogeneous materials for this part is above the limit requirement in SJ/T11363-2006

此附件旨在确保本产品符合中国 RoHS 标准。以下表格标示此产品中某有毒物质的含量符合中国 RoHS 标准规定的限量要求。

本产品上会附有”环境友好使用期限”的标签，此期限是估算这些物质”不会有泄漏或突变”的年限。本产品可能包含有较短的环境友好使用期限的可替换元件，像是电池或灯管，这些元件将会单独标示出来。

部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (CR(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
壳体	X	O	O	O	O	X
显示	X	O	O	O	O	X
印刷电路板	X	O	O	O	O	X
金属螺帽	X	O	O	O	O	O
电缆组装	X	O	O	O	O	X
风扇组装	X	O	O	O	O	X
电力供应组装	X	O	O	O	O	X
电池	O	O	O	O	O	O

O: 表示该有毒有害物质在该部件所有物质材料中的含量均在 SJ/T11363-2006 标准规定的限量要求以下。

X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T11363-2006 标准规定的限量要求。

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